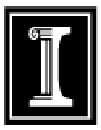

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The Long-Term Illinois River Fish Population Monitoring Program

Project F-101-R-16-20

Final Report (2004-2008)

with Program Amendment, 2009

Michael A. McClelland
and Greg G. Sass

Illinois River Biological Station
704 North Schrader Avenue
Havana, IL 62644

Division of Ecology and Conservation Sciences
Section for Field Stations and Ecosystems Studies

Final Report to the Illinois Department of Natural Resources
and the U.S. Fish and Wildlife Service

ILLINOIS
NATURAL
HISTORY
SURVEY

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DISCLAIMER

The findings, conclusions, and views expressed herein are those of the researchers and should not be considered as the official position of the United States Fish and Wildlife Service or the Illinois Department of Natural Resources.

ACKNOWLEDGMENT OF SUPPORT

The Long-term Illinois River Fish Population Monitoring Program (F-101-R) is supported by the Federal Aid in Sport Fish Restoration Act (P.L. 81-6814, Dingell-Johnson/Wallop-Breaux).

EXECUTIVE SUMMARY

During late August through early October each year for 2004-2008, 27 sites on the Illinois River Waterway and one site on Pool 26 of the Mississippi River were electrofished to monitor fish communities. A total of 35,446 fish representing 78 species (plus three hybrids) from 16 families were collected during 130.7 hours of sampling. Of these fishes, 34,478 individuals were collected from the Illinois Waterway sites, and 968 were collected from Brickhouse Slough of the Mississippi River. The year with the greatest overall catch of fishes was 2007 (8,768 individuals, $CPUE_N$ =332.9 fish per hour) and the year with the lowest overall catch of fishes was 2004 (3,655 individuals, $CPUE_N$=139.1 fish per hour). The greatest number of fish species collected for all stations combined occurred in 2008 (60 species plus one hybrid) and lowest number of fish species collected occurred in 2004 (54 species plus one hybrid). Nine new fish species and one new hybrid were collected during 2004-2008; banded killifish, blacknose dace, blackside darter, common shiner, creek chub, longnose dace, ribbon shiner, round goby, southern redbelly dace, and yellow bass x white perch. Fish species collections from the Upper Waterway reaches ranged from 17 for Starved Rock Reach in 2004 to 36 for Marseilles Reach in 2008. Middle Waterway reaches collections ranged from 26 fish species for LaGrange Reach in 2004 to 44 for Peoria Reach in 2006. The number of fish species collected from the Lower Waterway (Alton Reach) ranged from 24 in 2008 to 30 in 2005. The Peoria Reach consistently had the highest fish species richness during all years (2004-2008) of sampling for this project.

In May and June of 2009, experimental sampling for the amendment to project F-101-R was accomplished on the Illinois and Mississippi Rivers. Random pulsed-DC electrofishing collections were successfully conducted at 26 total sites in five Illinois River Waterway reaches (Alton, Peoria, Starved Rock, Marseilles, and Dresden) and two Mississippi River pools (Open River-Chain of Rocks Area and Pool 19). Multiple net gear collections (small and large mesh gill nets, benthic hoop nets, and standard hoop nets) were successfully conducted in the Open River-Chain of Rocks Area of the Mississippi River. A total of 1,240 fishes were collected representing 51 species (plus one hybrid) from 12 families. Pulsed-DC electrofishing collections resulted in 1,221 total fish ($CPUE_N$=187.8 fish per hour) representing 51 species (plus one hybrid) from 12 families during 6.5 hours of electrofishing. Electrofishing collections were the highest in the Open River pool of the Mississippi River in terms of total fish (285), but highest in Dresden Reach of the Illinois River Waterway in $CPUE_N$ (396.0 fish per hour). The highest number of fish species collected was recorded in Peoria Reach of the Illinois River Waterway where 31 species were observed. Net gear collections resulted in 19 fish representing six species from four families during two small mesh and two large mesh gill net sets, two benthic hoop net sets, and six standard hoop net sets. Standard and benthic hoop nets collected the highest total number of fish (8 each), while standard hoop nets collected the highest number of fish species (5). Pulsed-DC electrofishing and net gears collected three species new to F-101-R sampling; blue catfish, speckled chub, and spotted sucker.

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[a]Job numbers and titles refer to the F-101-R annual work plans

ACKNOWLEDGMENTS

Project F-101-R is supported by the Federal Aid to Sportfish Restoration Act (P.L. 81-681, Dingell-Johnson/Wallop-Breaux), with funds administered by the U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources (IDNR). Mr. Larry Dunham (IDNR), Dr. David Thomas, former Chief of the Illinois Natural History Survey (INHS), Dr. Brian Anderson, Director of the Illinois Natural History Survey, Dr. John Epifanio, former Director of the Center for Aquatic Ecology (INHS), and Dr. Michael Douglas, Director of the Division of Ecology and Conservation Sciences provided administrative support. Clerical support and data entry were provided by Ms. Cammy Smith, Ms. Nerissa Michaels, and Mr. Matt Stroub of the Illinois River Biological Station at. Mr. Thad Cook, Mr. Matt O'Hara, Ms. Nerissa Michaels, Mr. Matt Stroub, Mr. Jared Woodcock, Mr. John Wisher, Mr. Maurice Sisson III, Mr. Denim Perry, and Mr. Brett Feger assisted with the field work in 2004-2008. Assistance with field sampling conducted in May-June 2009 for program amendment was provided by Mr. Nick Bloomfield, Mr. Kyle Hopps, Mr. Eric Hine, Mr. Ryan Hastings, Mr. Eric Gittinger, Mr. Eric Ratcliff, Mr. Zach Lancaster, Mr. Chris McElyea, and Mr. Thad Cook. Field collections for Alton Reach of the Illinois River and the Open River reach for program amendment sampling were coordinated by Mr. Ben Lubinski. Dr. Mark Pegg was Principal Investigator in 2004-2005. This survey was originally conceived and initiated in 1957 by the late Dr. William C. Starrett.

INTRODUCTION

The goals of the Long-Term Illinois River Fish Population Monitoring Program include: 1) determination of spatial and temporal trends in fish populations of the Illinois River; 2) develop a long-term fisheries database useful for evaluating resource management strategies; and 3) provide information required to manage the fishery of the Illinois River. This report presents a summary of data collected from 2004-2008 during segments 16-20 of federal aid project F-101-R, The Long-term Illinois River Fish Population Monitoring Program. Previous summaries of the long-term data set, begun in 1957, were given by Sparks and Starrett (1975), Sparks (1977), Sparks and Lerczak (1993), Lerczak and Sparks (1994), Lerczak et al. (1994), Koel and Sparks (1999), and McClelland and Pegg (2004). The annual reports for project F-101-R have continuously built on previously collected data with major analyses of the long-term data set scheduled for the five-year project reports at the end of each segment. The format used in this report is patterned after previous annual reports of this project (Lerczak et al. 1993, 1994, 1995, and 1996; Koel et al. 1997 and 1998; Koel and Sparks, 1999; Arnold et al. 2000; McClelland and Pegg 2001, 2002, 2003, 2004, 2005; McClelland and Cook 2006; McClelland and Sass 2007, 2008) to allow for easy comparisons of data among years. The objective of this report is to provide a summary document of Illinois River fish population data collected during federal aid project F-101-R from 2004-2008 with summary of sampling conducted in May-June 2009 as provided for by project amendment of 2009.

STUDY AREA AND METHODS

Twenty-seven sites at fixed locations were sampled for fish along the Illinois Waterway. Twenty-six of these site locations were defined by Sparks and Starrett (1975) and Lerczak et al. (1994). In 1999, the twenty-seventh site was added at Moore=s Towhead on the Alton Reach, Illinois River mile 75.3, to more closely monitor fish communities near the Nature Conservancy=s (TNC) floodplain restoration project (Spunky Bottoms); (Figure 1). Twenty-five of the sites were along the Illinois River, with two additional sites on the lower Des Plaines River. The Des Plaines River, along with the Illinois River, forms part of the Illinois Waterway. One additional site was on the Mississippi River (Figure 1). Seventeen of the sites were in side channels; the remaining sites were in other habitats, including the main channel border, or in a combination of habitat types (see Lerczak et al. 1994).

Following water quality measurements (e.g., dissolved oxygen) at each site, fish populations were sampled by electrofishing from a 16-ft (5-m) aluminum boat using a 3000-watt, three-phase AC generator. Sampling at each site typically lasted one hour. Stunned fish were gathered with a dip net (1/4-in [0.64-cm] mesh) and stored in an oxygenated livewell until sampling was completed. Fish were then identified to species, measured (total length and weight), inspected for externally visible abnormalities, and returned to the water. A detailed description of the electrofishing methods and equipment are given by Lerczak et al. (1994).

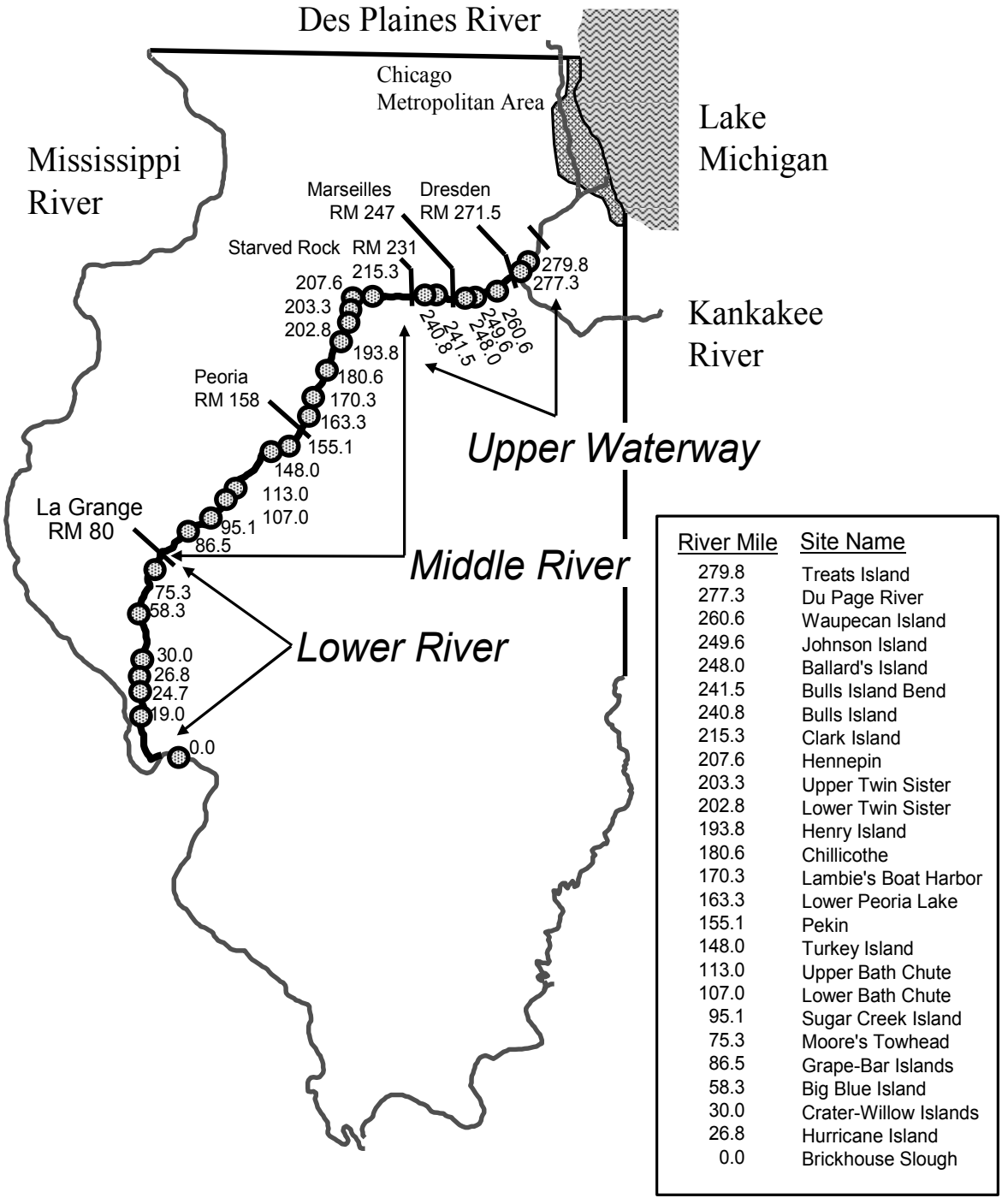

Figure 1. Map of the Illinois River waterway illustrating the three segments of the Illinois River Waterway with sites sampled by electrofishing to monitor fish communities in 2004-2008.

CRITERIA FOR SAMPLING

Fish collection by the Long-term Illinois River Fish Population Monitoring Program occurs during a 6 week window from the last week in August through the first week in October each year to increase the probability of collecting young-of-year fishes with a ¼ inch mesh dip net. Sampling at each site is only conducted if river water levels are low and stable, as determined by the U.S. Army Corps of Engineers, who maintain gage sites along the length of the Illinois Waterway. Also, sampling for this project does not occur if water temperatures have fallen unseasonably low (below 14.4 C), which are not typically reached on the Illinois River until mid-October (Kofoid 1903, LTRMP unpublished data 1999).

DATA ANALYSIS

At each site, number of individual fish and total weight (pounds) were tallied for each species. Fish catch rates were calculated as the number of individuals collected per hour of electrofishing ($CPUE_N$) and as weight in pounds collected per hour of electrofishing ($CPUE_W$). Catch data, in numbers of individuals and pounds collected per sample and hour, were summarized and reported by collection site. Data from sites were also grouped into reaches defined by navigation dams (Figure 1) as follows: Alton Reach, river mile (RM) 0-80; La Grange Reach, RM 80-158; Peoria Reach, RM 158-231; Starved Rock Reach, RM 231-247; Marseilles Reach, RM 247-271.5; and Dresden Reach, RM 271.5-286 on the Des Plaines River. Data from reaches were combined

further into three groups (lower and middle Illinois River segments, and the upper Illinois Waterway segment) defined by their location along the river and by the amount of off-channel habitat accessible to fish per unit length of river (Lerczak et al. 1994 and Figure 1). Lerczak et al. (1994, 1995, and 1996) showed that river fish communities of the three segments differed substantially enough to give segment designations biological meaning.

RESULTS AND DISCUSSION (Job 4)

A. Project F-101-R Field Sampling, 2004-2008

Before the fish sampling season began, all equipment was tested and repaired as necessary, and staff were given a review in safety procedures and electrofishing methods **(Job 1).**

All field sampling occurred between late August and early October each year with typically one hour spent electrofishing at each of 28 sites **(Job 2)**. Collected data were entered into Microsoft ACCESS 2000, and verified against original field data sheets until no errors were detected **(Job 3)**. The original data sheets from this segment's sampling and all of the other original data sheets of this project (1957-2003) are stored in flame-resistant cabinets at the Illinois River Biological Station at 704 N. Schrader Avenue, Havana **(Job 3)**.

B. CONDITIONS DURING ELECTROFISHING RUNS

All 28 long-term sites were sampled for fishes and physio-chemical parameters each year from 2004-2008. Site listings and water quality parameters are provided in Tables 1-5 **(Job 5).** All values were within the ranges expected based upon previous sampling (see Lerczak et al. 1994:17-24, Koel et al. 1999:12-14, and McClelland and Pegg 2004:15-19). All sites sampled were within our previously established water temperature criteria, two sites in Alton Reach (Dark Chute, RM 24.7 and Mortland Island, RM 19.0) were unable to be sampled due to high water conditions in 2008.

2004. Sampling was conducted in full daylight between 8:45 AM and 4:49 PM (Table 1). The ranges for physical measurements collected during the 2004 sampling season were as follows: air temperature, 57.4-87.6^{o} F; water temperature, 62.1-80.8^{o} F; dissolved oxygen concentration, 5.1-9.8 ppm; Secchi disk transparency, 7.9-39.8 in; conductivity, 346-878 µhos/cm; surface velocity, 0.2-0.4 ft/s; water depth, 0.5-6.0 ft. All values were within the ranges expected based upon previous sampling (see Lerczak et al. 1994; Koel and Sparks, 1999). All sites were sampled within our established water temperature and river level criteria (Table 1).

2005. Sampling was conducted in full daylight between 8:15 AM and 2:45 PM (Table 2). The ranges for physical measurements collected during the 2005 sampling season were as follows: air temperature, 68.0-87.1 ^{o}F; water temperature, 73.8-86.4 ^{o}F; dissolved oxygen concentration, 4.8-9.6 ppm; Secchi disk transparency, 18.0-100.0 cm; conductivity, 446-844 µhos/cm; surface velocity, 0.02-0.30 ft/s; water depth, 0.5-7.0 ft.

Table 1. Station information and characteristics during sampling in 2004. All stations except where noted are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.	Volts	Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(% Sat.)	(cm)	(umhos)		(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
28	5-Oct	0.0	Brickhouse Slough[u]	204.9	205.3	205.1	10:57	1.00	57.4	62.1	9.53	98.40%	21.0	346	225	0.04	1.0	5.0	
Alton Reach																			
18	23-Sep	19.0	Mortland Island	18.1	19.5	18.8	16:49	1.00	80.0	75.2	7.70	100.16%	29.0	619	215	0.12	1.5	6.0	2.5
21	24-Sep	24.7	Dark Chute	24.5	25.5	25.0	12:45	1.00	77.2	74.8	7.15	90.63%	28.0	638	170	0.15	1.5	6.0	2.5
20	24-Sep	26.8	Hurricane Island	27.0	27.9	27.5	10:44	1.00	71.0	73.8	6.52	77.85%	31.0	626	170	0.23	1.0	6.0	2.5
19	24-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	8:54	1.00	67.9	73.6	6.78	78.46%	31.0	624	170	0.13	1.3	5.5	2.5
26	1-Oct	58.3	Big Blue Island	58.0	59.0	58.5	9:35	1.00	62.3	70.2	8.46	92.27%	30.0	679	160	0.03	1.0	5.0	2.0
27	4-Oct	75.3	Moore's Towhead	74.8	75.8	75.3	13:26	1.00	57.4	65.3	9.66	99.74%	27.0	656	185	0.10	0.5	5.5	2.1
La Grange Reach																			
6	10-Sep	86.5	Grape-Bar Islands	85.7	87.0	86.4	11:48	1.00	78.6	74.7	5.89	75.64%	24.0	606	180	0.26	1.0	6.0	429.8
5	10-Sep	95.1	Sugar Creek Island	94.5	95.0	94.8	9:15	1.00	62.4	74.1	5.44	59.40%	25.0	583	170	0.24	1.4	5.5	429.8
8	13-Sep	107.1	Lower Bath Chute	106.9	107.3	107.1	14:34	0.80	86.2	76.6	5.31	72.98%	24.0	610	215	0.21	1.5	5.5	430.7
7	13-Sep	113.0	Upper Bath Chute	112.8	113.2	113.0	12:40	1.00	83.2	76.8	6.63	88.76%	25.0	629	175	0.22	1.2	5.5	430.7
17	22-Sep	148.0	Turkey Island	148.0	148.3	148.2	12:40	0.50	79.0	74.6	8.20	105.69%	28.0	707	210	0.24	1.2	6.0	431.8
25	28-Sep	155.1	Pekin	154.5	155.3	154.9	15:42	1.00	75.0	71.1	9.84	122.16%	28.0	754	160	0.12	0.5	5.5	430.3
Peoria Reach																			
2	8-Sep	163.4	Lower Peoria Lake	163.5	163.6	163.6	13:17	1.00	74.3	70.3	7.68	94.70%	20.0	566	200	0.04	1.5	2.2	439.8
1	3-Sep	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	10:35	1.00	78.9	76.9	5.14	66.19%	22.0	560	170	0.02	1.7	4.0	441.4
3	7-Sep	180.6	Chillicothe	180.6	181.1	180.9	9:26	1.00	66.4	74.2	5.59	63.69%	30.0	574	180	0.11	1.5	4.0	441.5
4	7-Sep	193.8	Henry Island	193.3	194.5	193.9	12:31	1.00	71.0	74.8	5.97	71.28%	22.0	601	175	0.42	1.3	6.0	441.5
13	17-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	12:02	1.00	74.1	77.0	8.28	101.91%	38.0	730	215	0.18	1.0	5.5	441.0
12	17-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	10:09	1.00	73.5	76.6	7.86	96.18%	36.0	729	215	0.12	1.5	6.0	441.0
11	15-Sep	207.7	Hennepin	207.6	208.1	207.9	13:43	1.00	77.0	77.9	8.74	110.58%	35.0	744	210	0.16	1.0	5.5	440.8
22	27-Sep	215.3	Clark Island	214.9	215.6	215.3	16:14	1.00	76.9	74.3	9.71	122.73%	40.0	787	140	0.17	1.5	6.0	440.5
Starved Rock Reach																			
10	14-Sep	240.8	Bulls Island	240.3	241.0	240.7	13:36	1.00	87.6	79.3	8.28	115.17%	41.0	735	205	0.08	1.0	6.0	459.1
9	14-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	12:10	1.00	79.1	78.8	7.72	99.60%	50.0	732	210	0.09	1.0	5.5	459.1
Marseilles Reach															210				
14	21-Sep	248.0	Ballards Island	247.7	248.2	248.0	9:53	1.00	73.3	77.4	9.60	117.24%	101.0	806	215	0.18	0.5	5.0	483.9
15	21-Sep	249.7	Johnson Island	249.7	249.8	249.8	11:24	0.50	79.0	77.7	9.36	120.64%	82.0	788	210	0.11	0.5	3.0	483.9
16	21-Sep	260.6	Waupecan Island	260.2	261.1	260.7	14:07	1.00	79.1	79.2	9.12	117.66%	88.0	815	160	0.18	1.0	5.5	483.9
Dresden Reach																			
23	28-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	9:21	1.00	60.2	79.9	7.62	81.21%	60.0	878	140	0.12	1.0	5.5	504.4
24	28-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	11:48	1.00	67.2	80.8	7.42	85.24%	55.0	874	140	0.12	1.0	5.0	504.4
Minimum								0.5	57.4	62.1	5.1	59.40%	20	346	140	0.02	0.5	2.2	
Maximum								1.00	87.6	80.8	9.8	122.70%	101	878	225	0.42	1.7	6.0	
Mean								0.96	73.4	74.9	7.7	93.8%	38.25	678	193	0.15	1.1	5.3	
Total time electrofished								26.80											

[a]Refers to approximate average river mile electrofished at each site, 1957-2004.
[u]Estimated during sampling.
[c]Feet above sea level at the U.S. Army Corps of Engineers river gage nearest to the sampling site.
[u]Mississippi River.
[e]Des Plaines River.

Table 2. Station information and characteristics during sampling in 2005. All stations except where noted are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.	Volts	Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(% Sat.)	(cm)	(umhos)		(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
28	26-Sep	0.0	Brickhouse Slough[d]	204.9	205.3	205.1	11:20	1.00	72.4	75.2	6.45	78.08%	31.0	446	200	0.03	0.5	6.0	
Alton Reach																			
18	2-Sep	19.0	Mortland Island	18.1	19.5	18.8	11:10	1.00	79.0	80.4	9.42	121.42%	31.0	809	160	0.15	0.5	6.0	1.8
21	2-Sep	24.7	Dark Chute	24.5	25.5	25.0	8:15	1.00	68.0	79.3	7.67	88.84%	30.0	807	160	0.05	0.5	6.0	1.8
20	1-Sep	26.8	Hurricane Island	27.0	27.9	27.5	13:50	1.00	86.9	81.1	8.95	123.75%	30.0	803	160	0.15	0.5	6.5	2.0
19	1-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	11:30	1.00	79.0	80.1	7.78	100.28%	30.0	806	160	0.11	0.5	6.0	2.0
26	30-Aug	58.3	Big Blue Island	58.0	59.0	58.5	12:30	1.00	78.6	81.1	7.18	92.20%	38.0	824	140	0.09	0.5	5.5	1.9
27	30-Aug	75.3	Moore's Towhead	74.8	75.8	75.3	9:55	0.83	77.7	79.9	6.24	79.47%	34.0	816	140	0.21	0.5	5.0	1.9
La Grange Reach																			
6	23-Aug	86.5	Grape-Bar Islands	85.7	87.0	86.4	12:20	1.00	78.6	83.5	6.19	79.49%	28.0	836	140	0.19	0.5	6.5	429.7
5	23-Aug	95.1	Sugar Creek Island	94.5	95.0	94.8	9:40	1.00	68.9	82.9	5.20	60.79%	28.0	828	150	0.19	0.5	5.5	429.7
8	22-Aug	107.1	Lower Bath Chute	106.9	107.3	107.1	14:30	1.00	83.2	85.1	6.22	83.27%	28.0	828		0.15	1.0	6.0	430.4
7	22-Aug	113.0	Upper Bath Chute	112.8	113.2	113.0	10:28	1.00	77.9	84.4	4.79	61.11%	29.0	827	140	0.28	1.0	6.0	430.4
17	29-Aug	148.0	Turkey Island	148.0	148.3	148.2	13:55	0.58	83.2	83.5	5.82	77.92%	18.0	844	140	0.09	0.5	6.0	430.2
25	29-Aug	155.1	Pekin	154.5	155.3	154.9	10:10	1.00	79.0	79.7	6.48	83.52%	25.0	831	140	0.30	0.5	6.0	430.4
Peoria Reach																			
2	24-Aug	163.4	Lower Peoria Lake	163.5	163.6	163.6	9:40	1.00	75.2	73.8	7.68	95.52%	18.0	806	140	0.05	0.5	3.5	440.8
1	24-Aug	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	13:00	0.75	83.3	76.1	9.61	128.77%	18.0	806	140	0.02	0.5	3.0	440.8
3	25-Aug	180.6	Chillicothe	180.6	181.1	180.9	9:40	1.00	71.0	78.4	7.01	83.70%	19.0	786	140	0.13	0.5	5.5	441.0
4	25-Aug	193.8	Henry Island	193.3	194.5	193.9	13:21	1.00	72.4	79.7	7.66	92.73%	34.0	769	150	0.07	0.5	6.0	441.0
13	20-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	13:05	1.00	80.1	78.4	8.33	108.45%	53.0	730	160	0.19	0.5	6.0	441.4
12	20-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	10:45	1.00	78.9	76.5	7.09	91.30%	50.0	733	160	0.19	1.0	6.5	441.4
11	31-Aug	207.7	Hennepin	207.6	208.1	207.9	10:45	1.00	74.1	81.5	8.27	101.78%	64.0	770	150	0.21	0.5	6.5	440.9
22	12-Sep	215.3	Clark Island	214.9	215.6	215.3	11:30	1.00	83.3	80.8	7.04	94.33%	59.0	785	150	0.21	0.5	2.5	441.0
Starved Rock Reach																			
10	6-Sep	240.8	Bulls Island	240.3	241.0	240.7	14:45	1.00	85.5	83.1	9.17	125.27%	55.0	776	160	0.10	0.5	7.0	458.9
9	6-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	14:45	1.00	85.5	83.1	9.17	125.27%	55.0	776	160	0.10	0.5	7.0	458.9
Marseilles Reach																			
14	7-Sep	248.0	Ballards Island	247.7	248.2	248.0	8:00	1.00	68.4	81.1	7.62	88.63%	64.0	800	160	0.11	0.5	5.0	483.5
15	7-Sep	249.7	Johnson Island	249.7	249.8	249.8	9:45	0.42	78.6	82.0	8.66	111.21%	70.0	766	160	0.11	0.5	4.5	483.5
16	7-Sep	260.6	Waupecan Island	260.2	261.1	260.7	12:00	1.00	83.2	84.2	8.00	107.10%	68.0	770	160	0.10	0.5	5.5	483.5
Dresden Reach																			
23	21-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	11:45	1.00	80.1	83.1	6.25	81.37%	100.0	702	160	0.03	0.5	6.0	504.4
24	21-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	14:35	1.00	87.1	86.4	6.34	87.81%	86.0	721	150	0.09	0.5	5.5	504.4
Minimum								0.42	68.0	73.8	4.8	61.11%	18	446	140	0.02	0.5	2.5	
Maximum								1.00	87.1	86.4	9.6	128.77%	100	844	200	0.30	1	7.0	
Mean								0.95	78.5	80.9	7.4	94.8%	42.61	779	148	0.13	0.6	5.6	
Total time electrofished								26.58											

[a]Refers to approximate average river mile electrofished at each site, 1957-2004.

[b]Estimated during sampling.

[c]Feet above sea level at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

[d]Mississippi River.

[e]Des Plaines River.

Table 3. Station information and characteristics during sampling in 2006. All stations, except where noted, are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.	Volts	Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(% Sat.)	(cm)	(umhos)		(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
27	6-Oct	0.0	Brickhouse Slough[u]	204.9	205.3	205.1	11:20	1.00	62.3	65.0	10.33	112.67%	32.0	480	190	0.09	0.5	6.5	
Alton Reach																			
24	4-Oct	19.0	Mortland Island	18.1	19.5	18.8	17:25	1.00	74.1	69.4	9.26	113.97%	41.0	706	190	0.22	1.0	7.0	2.5
23	4-Oct	24.7	Dark Chute	24.5	25.5	25.0	15:20	1.00	80.1	70.2	9.44	122.91%	44.0	712	190	0.12	1.0	6.5	2.5
22	4-Oct	26.8	Hurricane Island	27.0	27.9	27.5	13:35	1.00	86.2	69.8	9.39	129.05%	49.0	716	190	0.23	1.0	7.0	2.5
21	4-Oct	30.0	Crater-Willow Island	29.2	30.8	30.0	11:45	1.00	80.1	69.2	9.21	119.91%	47.0	718	190	0.20	1.0	7.0	2.5
25	5-Oct	58.3	Big Blue Island	58.0	59.0	58.5	8:35	1.00	58.3	68.1	9.38	97.85%	44.0	747	190	0.24	0.5	6.5	2.5
26	5-Oct	75.3	Moore's Towhead	74.8	75.8	75.3	11:15	0.75	63.9	67.9	10.31	114.41%	36.0	746	190	0.24	0.5	5.0	2.5
La Grange Reach																			
5	28-Aug	86.5	Grape-Bar Islands	85.7	87.0	86.4	12:15	1.00	79.0	81.1	5.42	69.86%	30.0	741	160	0.23	1.0	7.0	9.7
4	28-Aug	95.1	Sugar Creek Island	94.5	95.0	94.8	9:40	1.00	74.2	81.3	4.58	56.42%	29.0	755	155	0.21	1.0	5.5	9.7
3	25-Aug	107.1	Lower Bath Chute	106.9	107.3	107.1	12:01	0.83	78.9	81.3	5.24	67.48%	21.0	738	150	0.18	1.0	6.0	5.6
2	3-Oct	113.0	Upper Bath Chute	112.8	113.2	113.0	9:13	1.00	78.6	81.9	5.39	69.22%	21.0	745	150	0.28	1.0	6.0	5.6
19	3-Oct	148.0	Turkey Island	148.0	148.3	148.2	10:45	0.58	80.0	69.1	9.55	124.23%	37.0	768	190	0.30	1.0	6.5	3.2
20	29-Aug	155.1	Pekin	154.5	155.3	154.9	12:50	0.75	86.2	70.0	11.90	163.55%	35.0	769	190	0.16	0.5	6.0	431.5
Peoria Reach																			
17	19-Sep	163.4	Lower Peoria Lake	163.5	163.6	163.6	11:40	1.00	57.2	63.9	8.04	82.82%	12.0	631	160	0.06	0.5	4.0	12.0
1	24-Aug	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	10:18	0.88	79.7	78.8	8.95	116.10%	15.0	725	150	0.02	0.5	3.0	11.7
15	5-Sep	180.6	Chillicothe	180.6	181.1	180.9	10:20	1.00	66.4	75.3	7.47	85.11%	29.0	677	160	0.24	0.5	6.0	15.2
16	7-Sep	193.8	Henry Island	193.3	194.5	193.9	11:30	1.00	79.0	76.5	8.50	109.56%	32.0	684	160	0.25	1.0	6.0	15.5
7	29-Aug	202.8	Lower Twin Sister	202.4	203.2	202.8	12:40	1.00	72.3	77.9	6.27	75.83%	43.0	759	165	0.35	0.5	6.5	15.4
6	29-Aug	203.3	Upper Twin Sister	203.3	203.5	203.4	10:40	1.00	67.5	77.8	6.01	69.26%	40.0	756	165	0.39	1.0	7.0	15.4
18	21-Sep	207.7	Hennepin	207.6	208.1	207.9	10:55	1.00	66.9	65.8	8.71	99.75%	42.0	672	170	0.33	0.5	6.5	15.3
28	17-Oct	215.3	Clark Island	214.9	215.6	215.3	10:30	1.00		52.2	10.90	38.28%	41.0	816	200	0.42	1.0	7.0	11.6
Starved Rock Reach																			
9	30-Aug	240.8	Bulls Island	240.3	241.0	240.7	13:45	1.00	78.8	79.3	7.69	98.94%	31.0	672	170	0.35	2.0	7.0	459.9
8	30-Aug	241.5	Bulls Island Bend	241.1	241.6	241.4	11:40	1.00	71.6	79.3	7.60	91.28%	35.0	673	170	0.44	1.0	7.0	459.9
Marseilles Reach													32.0						
10	31-Aug	248.0	Ballards Island	247.7	248.2	248.0	9:00	1.00	69.3	76.5	7.37	86.51%	32.0	670	160	0.28	1.0	5.0	6.5
11	31-Aug	249.7	Johnson Island	249.7	249.8	249.8	10:55	0.50	74.2	76.9	7.51	92.52%	45.0	638	160	0.38	1.0	4.5	6.5
12	31-Aug	260.6	Waupecan Island	260.2	261.1	260.7	13:40	1.00	79.5	77.2	8.27	107.08%	68.0	634	140	0.49	1.0	6.0	6.5
Dresden Reach																			
13	1-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	8:35	1.00	68.9	79.5	7.41	86.62%	44.0	591	140	0.13	1.0	6.0	505.3
14	1-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	11:05	1.00	72.4	77.3	7.46	90.31%	44.0	598	160	0.18	1.0	6.0	505.3
Minimum								0.42	68.0	73.8	4.8	61.11%	18	446	140	0.02	0.5	2.5	
Maximum								1.00	87.1	86.4	9.6	128.77%	100	844	200	0.30	1	7.0	
Mean								0.94	70.9	73.5	8.1	96.1%	37.54	698	170	0.25	0.9	6.1	
Total time electrofished								26.29											

[a]Refers to approximate average river mile electrofished at each site, 1957-2006.

[u]Estimated during sampling.

[c]Feet above sea level or river stage (ft) at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

[u]Mississippi River.

[e]Des Plaines River.

Table 4. Station information and characteristics during sampling in 2007. All stations, except where noted, are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.	Volts	Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(% Sat.)	(cm)	(umhos)		(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
8	13-Sep	0.0	Brickhouse Slough[d]	204.9	205.3	205.1	10:48	1.00	77.7	73.6	10.43	132.82%	19.0	435	225	0.02	0.5	7.0	
Alton Reach																			
23	26-Sep	19.0	Mortland Island	18.1	19.5	18.8	15:35	1.00	70.9	76.6	7.21	86.00%	35.0	736	220	0.20	1.0	8.0	2.35
22	26-Sep	24.7	Dark Chute	24.5	25.5	25.0	13:30	1.00	67.9	75.7	7.10	82.16%	19.0	743	225	0.21	0.5	11.0	2.35
21	26-Sep	26.8	Hurricane Island	27.0	27.9	27.5	11:40	1.00	63.9	75.7	6.75	74.90%	19.0	750	225	0.17	1.0	8.0	2.35
20	26-Sep	30.0	Crater-Willow Island	29.2	30.8	30.0	9:55	1.00	61.9	75.7	6.75	73.30%	28.0	750	225	0.19	1.0	7.5	2.35
24	27-Sep	58.3	Big Blue Island	58.0	59.0	58.5	9:55	1.00	67.0	75.6	7.12	81.63%	33.0	765	220	0.20	1.0	6.5	2.30
25	27-Sep	75.3	Moore's Towhead	74.8	75.8	75.3	12:20	0.42	78.6	76.8	7.70	98.88%	29.0	772	225	0.30	0.5	5.0	2.30
La Grange Reach																			
16	22-Sep	86.5	Grape-Bar Islands	85.7	87.0	86.4	10:48	1.00	71.6	74.7	6.62	79.51%	20.0	766	225	0.20	0.5	6.0	9.96
15	22-Sep	95.1	Sugar Creek Island	94.5	95.0	94.8	8:40	1.00	67.1	74.8	6.47	74.25%	24.0	736	225	0.25	1.0	6.0	9.96
18	24-Sep	107.1	Lower Bath Chute	106.9	107.3	107.1	11:48	1.00	87.0	76.6	6.25	86.49%	23.0	737	225	0.33	1.0	6.5	6.10
17	24-Sep	113.0	Upper Bath Chute	112.8	113.2	113.0	9:24	1.00	79.1	76.8	6.43	82.95%	22.0	765	225	0.33	1.0	7.0	6.10
26	28-Sep	148.0	Turkey Island	148.0	148.3	148.2	9:13	0.50	61.9	74.3	7.45	80.90%	18.0	792	225	0.25	1.0	7.5	3.26
28	1-Oct	155.1	Pekin	154.5	155.3	154.9	9:30	1.00	66.1	70.0	8.33	94.61%	26.0	798	225	0.31	0.5	7.0	431.50
Peoria Reach																			
9	14-Sep	163.4	Lower Peoria Lake	163.5	163.6	163.6	9:25	1.00	60.8	68.1	9.27	99.46%	13.0	664	225	0.01	2.0	4.0	12.87
27	28-Sep	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	12:00	0.92	78.8	69.8	12.97	166.86%	12.0	754	225	0.02	0.5	3.0	12.01
10	17-Sep	180.6	Chillicothe	180.6	181.1	180.9	11:00	1.00	78.6	69.6	10.41	133.68%	21.0	745	225	0.31	0.5	7.0	14.84
11	18-Sep	193.8	Henry Island	193.3	194.5	193.9	10:40	1.00	79.0	71.1	11.06	142.55%	30.0	726	230	0.32	1.0	6.0	14.69
14	19-Sep	202.8	Lower Twin Sister	202.4	203.2	202.8	15:35	1.00	79.1	74.7	13.78	177.78%	31.0	754	230	0.21	1.0	7.0	14.76
13	19-Sep	203.3	Upper Twin Sister	203.3	203.5	203.4	12:55	1.00	79.9	74.1	13.22	171.81%	27.0	765	225	0.27	1.0	7.0	14.76
12	19-Sep	207.7	Hennepin	207.6	208.1	207.9	10:26	1.00	78.6	73.4	12.39	159.11%	34.0	766	225	0.21	0.5	7.0	14.76
19	25-Sep	215.3	Clark Island	214.9	215.6	215.3	10:40	1.00	79.0	76.5	9.03	116.39%	44.0	798	225	0.21	1.0	6.0	11.52
Starved Rock Reach																			
2	4-Sep	240.8	Bulls Island	240.3	241.0	240.7	13:10	1.00	88.9	80.2	8.82	124.05%	53.0	708	230	0.28	1.0	6.5	460.40
1	4-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	11:25	1.00	86.3	79.3	8.54	117.47%	38.0	706	230	0.41	1.0	6.0	460.40
Marseilles Reach													32.0						
3	5-Sep	248.0	Ballards Island	247.7	248.2	248.0	12:00	1.00	91.1	80.6	9.00	128.93%	62.0	712	230	0.51	0.5	6.0	6.93
4	5-Sep	249.7	Johnson Island	249.7	249.8	249.8	13:25	0.50	89.0	80.8	8.80	123.87%	59.0	713	230	0.43	0.5	4.0	6.93
5	5-Sep	260.6	Waupecan Island	260.2	261.1	260.7	17:00	1.00	88.1	81.5	9.17	128.10%	59.0	713	230	0.40	1.0	6.5	6.93
Dresden Reach																			
6	6-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	8:25	1.00	76.9	82.0	7.40	93.54%	81.0	786	225	0.04	1.0	6.5	505.40
7	6-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	10:53	1.00	79.0	82.6	7.00	90.22%	65.0	774	225	0.26	1.0	6.0	505.40
Minimum								0.42	60.8	68.1	6.3	61.11%	12.0	435	220	0.01	0.5	3.0	
Maximum								1.00	91.1	82.6	13.8	128.77%	81.0	798	230	0.51	1	11.0	
Mean								0.94	76.2	75.8	8.8	110.8%	34.9	737	226	0.24	0.9	6.5	
Total time electrofished								26.34											

[a]Refers to approximate average river mile electrofished at each site, 1957-2007.

[b]Estimated during sampling.

[c]Feet above sea level or river stage (ft) at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

[d]Mississippi River.

[e]Des Plaines River.

Table 5. Station information and characteristics during sampling in 2008. All stations, except where noted, are on the Illinois River and are listed in downstream-to-upstream order. Site miles are the average river mile and refer to Figure 1.

Sampling		Site		Sample river mile			End time	Duration	Temp (°F)		DO		Secchi	Cond.	Volts	Vel.	Depth[b] (ft)		Stage[c]
Order	Date	Mile[a]	Name	lower	upper	mean	(CST)	(h)	air	water	(ppm)	(% Sat.)	(cm)	(umhos)		(ft/s)	min	max	(ft)
Reach 26, Mississippi River																			
22	8-Oct	0.0	Brickhouse Slough[b]	204.9	205.3	205.1	11:05	1.00	61.9	66.2	8.50	92.30%	21.0	353	225	0.01	0.5	5.5	
Alton Reach																			
10	3-Sep	26.8	Hurricane Island	27.0	27.9	27.5	9:55	0.93	68.9	79.2	3.60	42.08%	22.0	485	220	0.06	1.0	7.0	1.99
8	28-Aug	30.0	Crater-Willow Island	29.2	30.8	30.0	9:30	1.00	79.0	80.4	5.20	67.02%	27.0	648	220	0.13	0.5	7.0	1.92
7	27-Aug	58.3	Big Blue Island	58.0	59.0	58.5	11:30	1.00	78.6	80.1	6.70	86.04%	19.0	655	220	0.15	0.5	6.0	2.14
6	27-Aug	75.3	Moore's Towhead	74.8	75.8	75.3	8:45	0.75	68.9	78.6	6.40	74.82%	26.0	652	220	0.19	0.5	6.0	2.14
La Grange Reach																			
11	8-Sep	86.5	Grape-Bar Islands	85.7	87.0	86.4	12:50	1.00	61.9	70.7	5.50	59.73%	16.0	648	220	0.56	1.0	7.0	10.51
9	2-Sep	95.1	Sugar Creek Island	94.5	95.0	94.8	11:23	1.00	87.1	82.4	5.00	69.25%	18.0	676	220	0.20	0.5	5.5	9.68
4	25-Aug	107.1	Lower Bath Chute	106.9	107.3	107.1	9:30	1.00	68.9	79.9	4.50	52.61%	17.0	655	220	0.20	0.5	7.0	6.27
3	22-Aug	113.0	Upper Bath Chute	112.8	113.2	113.0	9:06	1.00	77.0	80.6	5.00	63.26%	24.0	654	220	0.13	1.0	7.0	5.78
2	21-Aug	148.0	Turkey Island	148.0	148.3	148.2	12:30	0.58	70.3	81.7	5.90	69.95%	23.0	663	220	0.23	0.5	7.5	3.19
1	21-Aug	155.1	Pekin	154.5	155.3	154.9	10:20	1.00	68.0	80.2	7.20	83.40%	22.0	640	220	0.23	0.5	7.0	431.50
Peoria Reach																			
12	9-Sep	163.4	Lower Peoria Lake	163.5	163.6	163.6	9:15	1.00	59.3	64.9	7.20	75.97%	16.0	680	225	0.06	0.5	3.5	12.29
13	9-Sep	170.3	Lambie's Boat Harbor	170.6	170.8	170.4	12:50	1.00	70.8	68.2	9.30	110.82%	18.0	679	220	0.06	0.5	2.5	12.29
18	12-Sep	180.6	Chillicothe	180.6	181.1	180.9	10:15	1.00	70.3	71.1	6.80	80.62%	19.0	607	220	0.23	0.5	7.0	15.63
26	20-Oct	193.8	Henry Island	193.3	194.5	193.9	10:15	1.00	56.9	59.0	9.30	95.47%	42.0	660	220	0.41	0.5	7.0	15.30
25	17-Oct	202.8	Lower Twin Sister	202.4	203.2	202.8	13:40	1.00	55.2	63.0	8.40	84.54%	60.0	681	220	0.32	0.5	7.0	15.54
24	17-Oct	203.3	Upper Twin Sister	203.3	203.5	203.4	11:35	1.00	52.6	62.8	8.80	85.85%	54.0	683	220	0.29	0.5	7.0	15.54
23	17-Oct	207.7	Hennepin	207.6	208.1	207.9	9:50	1.00	49.2	62.6	8.60	80.43%	52.0	681	220	0.24	0.5	8.0	15.54
5	26-Aug	215.3	Clark Island	214.9	215.6	215.3	10:24	1.00	69.2	77.7	8.50	99.67%	33.0	708	220	0.14	0.5	6.5	10.75
Starved Rock Reach																			
15	10-Sep	240.8	Bulls Island	240.3	241.0	240.7	11:25	1.00	77.7	74.1	8.00	101.88%	52.0	621	220	0.29	0.5	7.5	459.60
14	10-Sep	241.5	Bulls Island Bend	241.1	241.6	241.4	9:30	1.00	61.1	72.7	8.00	86.12%	50.0	617	225	0.46	0.5	7.0	459.60
Marseilles Reach													32.0						
16	11-Sep	248.0	Ballards Island	247.7	248.2	248.0	10:08	1.00	70.2	73.2	7.60	90.02%	85.0	677	220	0.23	0.5	4.0	5.60
17	11-Sep	249.7	Johnson Island	249.7	249.8	249.8	11:35	0.42	74.3	73.8	7.60	93.72%	70.0	626	220	0.12	0.5	3.5	5.60
21	2-Oct	260.6	Waupecan Island	260.2	261.1	260.7	9:40	1.00	54.2	64.0	8.90	88.51%	78.0	594	225	0.46	1.0	6.0	6.27
Dresden Reach																			
19	24-Sep	277.4	Du Page River[e]	276.8	277.8	277.3	11:15	1.00	74.2	75.9	7.00	86.24%	67.0	854	215	0.05			504.50
20	24-Sep	279.9	Treats Island[e]	279.6	280.1	279.9	13:00	1.00	79.0	76.3	7.40	95.38%	60.0	852	215	0.17			504.50
Minimum								0.42	49.2	59.0	3.6	42.08%	16.0	353	215	0.01	0.5	2.5	
Maximum								1.00	87.1	82.4	9.3	110.82%	85.0	854	225	0.56	1	8.0	
Mean								0.95	67.9	73.1	7.1	81.4%	39.3	652	220	0.22	0.5	5.7	
Total time electrofished								24.68											

[a]Refers to approximate average river mile electrofished at each site, 1957-2008.

[b]Estimated during sampling.

[c]Feet above sea level or river stage (ft) at the U.S. Army Corps of Engineers river gage nearest to the sampling site.

[d]Mississippi River.

[e]Des Plaines River.

All values were within the ranges expected based upon previous sampling (Lerczak et al. 1994; Koel and Sparks 1999). All sites were sampled within our established water temperature and river level criteria.

2006. Sampling was conducted in full daylight between 7:35 AM and 4:25 PM central standard time (Table 3). The ranges for physical measurements collected during the 2006 sampling season were as follows: air temperature, 57.2-86.2 ^{o}F; water temperature, 52.2-81.9 ^{o}F; dissolved oxygen concentration, 4.58-11.90 ppm; Secchi disk transparency, 12.0-68.0 cm; conductivity, 480-816 µhos/cm; surface velocity, 0.02-0.49 ft/s; water depth, 0.5-7.0 ft. All physical values were within the ranges expected based upon previous sampling (Lerczak et al. 1994; Koel and Sparks 1999). All sites were sampled within established water temperature and river level criteria.

2007. Sampling was conducted in full daylight between 8:25 AM and 5:00 PM central standard time (Table 4). The ranges for physical measurements collected during the 2007 sampling season were as follows: air temperature, 60.8-91.1^{o} F; water temperature, 68.1-82.6^{o} F; dissolved oxygen concentration, 6.3-13.8 ppm; Secchi disk transparency, 12.0-81.0 cm; conductivity, 435-798 µhos/cm; surface velocity, 0.01-0.51 ft/s; water depth, 0.5-11.0 ft. All physical values were within the ranges expected based upon previous sampling (Lerczak et al. 1994; Koel and Sparks 1999). All sites were sampled within established water temperature and river level criteria.

2008. A total of 26 sites were sampled between 21 August and 20 October 2008; two sites were unable to be sampled due to high water conditions. River levels exceeded water level criteria at Dark Chute (RM 24.7) and Mortland Island (RM 19.0) in

Alton Reach during the sampling period. Sampling was conducted in full daylight between 8:45 AM and 1:40 PM central standard time (Table 5). The ranges for physical measurements collected during the 2008 sampling season were as follows: air temperature, 49.2-87.1^{o} F; water temperature, 59.0-82.4^{o} F; dissolved oxygen concentration, 3.6-9.3 ppm; Secchi disk transparency, 16.0-85.0 cm; conductivity, 353-854 µhos/cm; surface velocity, 0.01-0.56 ft/s; water depth, 0.5-8.0 ft. All physical values were within the ranges expected based upon previous sampling (Lerczak et al. 1994; Koel and Sparks 1999). The 26 sites sampled were within established water temperature and river level criteria.

C. Catch Rates in Numbers of Individuals

The following data summaries proceed through several levels of detail. First, data on the numbers of individual fish (by species) collected per hour at each of the 6 Illinois Waterway reaches and Pool 26 of the Mississippi River are presented. Number of individuals of each fish species collected per hour of electrofishing and species rankings by waterway reach and year are summarized in Tables 6-15. Common names used throughout this report follow Robins et al. (1991). Common and scientific names are listed in APPENDIX A.

Numbers of Fish Collected

We collected a total of 35,446 fish representing 78 species (plus 3 hybrids) from 16 families during 130.7h of sampling at 27 sites on the Illinois Waterway and a single site on the Mississippi River from 2004-2008. Of these fishes, 34,478 were collected from the Illinois Waterway sites while 968 were collected from the Brickhouse Slough site on the Mississippi River. The total collection numbers are the highest of all previous five year segments of F-101-R when only 12,573 total fish were collected from1989-1993, a total of 25,921 fish were collected from 1994-1998, and a total of 20,186 fish were collected from 1999-2003 (Lerczak et al. 1993, Koel and Sparks 1999, and McClelland and Pegg 2004). The total species collections are also higher than all the previous five years when 62 (plus 5 hybrids; 1989-1993), 60 (plus 3 hybrids; 1994-1998), and 64 (plus 4 hybrids; 1999-2003) fish species were collected. We collected nine new fish species plus one hybrid during 2004-2008: round goby and ribbon shiner (2004); blacknose dace, creek chub, and common shiner (2005); banded killifish and yellow bass x white perch hybrid (2006); southern redbelly dace (2007); blackside darter and longnose dace (2008). The greatest number of fish species collected from 2004-2008 for all stations combined in a single year occurred in 2008 (62 plus one hybrid) and the fewest occurred in 2004 (54 plus one hybrid). Fish species collections from the Upper Waterway reaches ranged from 17 in Starved Rock Reach in 2004 (Table 6) to 36 in Marseilles Reach in 2008 (Table 14). The number of species collected from the Middle Waterway reaches ranged from 26 in LaGrange Reach in 2004 (Table 6) to 44 in Peoria Reach in 2006 (Table 10). The number of species collected in the Lower Waterway (Alton Reach) ranged from 24 in 2008 (Table 14) to 30

in 2005 and 2006 (Tables 8 and 10). As in previous years, Peoria Reach consistently had the highest species richness over all reaches during all years (2004-2008).

Rankings by Relative Abundance

Rankings by relative abundance in number of fish collected per hour highlight the consistent dominance by gizzard shad and bluegill. Gizzard shad and bluegill were among the top three most collected fish species for all years except 2007, when silver carp and emerald shiner were collected in greater numbers than gizzard shad (Tables 6,8, 10, 12, and 14). Gizzard shad ranked first in numerical abundance in 3 reaches over several years (Alton Reach: 2004-2006, 2008; LaGrange Reach: 2004-2006; Peoria Reach: 2005, 2006, 2008), as did bluegill (Peoria Reach: 2004; Starved Rock Reach: 2005; Marseilles Reach: 2005; Dresden Reach 2004, 2005, 2007, 2008) (Tables 7, 9, 11, 13, and 15). Emerald shiners ranked first or second in numerical abundance in Starved Rock Reach in all years (Tables 7, 9, 11, 13, and 15). Emerald shiners also ranked first in Marseilles Reach in 2005-2007 (Tables 9, 11, 13). Silver carp ranked first in numerical abundance in LaGrange and Peoria reaches in 2007 (Table 13).

Table 6. Numbers of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2004.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 6.00	La Grange 5.30	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.80
Clupeidae								
gizzard shad	62.00	41.33	32.81	19.13	19.00	4.40	7.50	26.19
skipjack herring			0.94	0.13	0.50			0.26
threadfin shad		0.17	0.56	0.25			0.50	0.26
Cyprinidae								
bighead carp		0.17						0.04
bluntnose minnow					4.00	25.20	39.00	5.56
bullhead minnow	1.00	0.67	0.38	0.50	18.50	6.40		2.39
central stoneroller							0.50	0.04
common carp	2.00	7.17	12.94	6.00	0.50	2.40	6.00	6.75
emerald shiner	11.00	5.53	12.19	3.00	30.50	8.80	1.00	8.10
golden shiner				0.50				0.15
goldfish		0.17	0.75	0.13		0.40		0.26
grass carp		0.50	0.38	0.25				0.26
red shiner				0.25				0.07
ribbon shiner							0.50	0.04
silverband shiner		0.50	0.19					0.15
silver carp		2.33	4.88					1.83
silver chub	1.00	0.17		0.25				0.15
spotfin shiner				0.38	32.50	4.80	1.00	3.06
spottail shiner	1.00			1.13		0.80		0.41
Catostomidae								
bigmouth buffalo		0.83	1.13	7.13				2.54
black buffalo		0.17						0.04
golden redhorse				0.38	0.50	0.40		0.19
river carpsucker	2.00	1.00	0.19	2.75	0.50			1.20
shorthead redhorse		0.50	0.56	0.75				0.45
silver redhorse				0.13				0.04
smallmouth buffalo	1.00	0.83	2.81	12.13	1.00	1.20		4.59
Ictaluridae								
channel catfish	3.00	10.67	9.00	5.88	3.00	2.00	3.50	6.72
flathead catfish	1.00	0.83	1.13	0.25				0.05
freckled madtom		0.17						0.04
yellow bullhead				0.63			0.50	0.19
Moronidae								
white bass	5.00	4.83	12.94	7.50		0.80		6.16
white perch				0.13				0.04
yellow bass			0.38	0.50		0.40		0.11

Table 6. (continued)

Numbers of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2004.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 6.00	La Grange 5.30	Peoria 8.00	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.80
Centrarchidae								
black crappie	2.00	0.17	3.19	1.13	0.50	0.80	3.50	1.46
bluegill	18.00	2.50	4.88	46.50	6.00	6.80	67.00	22.16
bluegill X green sunfish				0.25			14.00	1.12
green sunfish	6.00	0.83		23.00	4.50	2.00	45.00	11.16
largemouth bass	2.00	1.67	0.75	4.38	2.50	4.80	22.50	4.22
longear sunfish					1.00			0.07
orangespotted sunfish	10.00	0.83	0.09	4.38		1.20		2.16
redear sunfish				0.50				0.15
rock bass							4.00	0.30
smallmouth bass				0.50	1.50	0.40	2.50	0.49
white crappie				0.38				0.11
Atherinidae								
brook silverside							0.50	0.04
Gobiidae								
round goby						0.80	3.50	0.34
Percidae								
logperch		0.17		0.13				0.07
sauger				2.38				0.71
slenderhead darter			0.19					0.04
walleye				0.25	0.50			0.11
Esocidae								
grass pickerel						0.40		0.04
Poeciliidae								
western mosquitofish			0.38					0.07
Fundulidae								
blackstripe topminnow						0.40	1.50	0.15
Sciaenidae								
freshwater drum	4.00	11.50	20.44	15.63		1.20		11.57
Total Number per hour	131.00	108.00	125.66	169.87	127.00	76.80	224.00	139.07
Number of species/hybrids	17/0	27/0	26/0	36/1	17/0	23/0	20/1	54/1

Table 7. Species ranks by relative abundance (number of fish collected per hour) for 2004 on the 6 reaches of the Illinois Waterway. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	1 (41.30)	1 (32.8)	3 (19.1)	3 (19.0)	7 (4.4)	6 (7.5)
skipjack herring		13 (0.9)				
Cyprinidae						
bullhead minnow				4 (18.5)	4 (6.4)	
bluntnose minnow				7 (4.0)	1 (25.2)	3 (39.0)
common carp	4 (7.2)	3 (12.9)	8 (6.0)		8 (2.4)	7 (6.0)
emerald shiner	5 (5.5)	5 (12.2)	11 (3.0)	2 (30.5)	2 (8.8)	
silver carp	8 (2.3)	7 (4.9)				
spotfin shiner				1 (32.5)	5 (4.8)	
spottail shiner			14 (1.1)		14 (0.8)	
Catostomidae						
bigmouth buffalo	11 (0.8)	11 (1.1)	7 (7.1)			
river carpsucker	10 (1.0)		12 (2.7)			
smallmouth buffalo	11 (0.8)	10 (2.8)	5 (12.1)		11 (1.2)	
Ictaluridae						
channel catfish	3 (10.7)	6 (9.0)	9 (5.9)	8 (3.0)	9 (2.0)	9 (3.5)
flathead catfish	11 (0.8)	11 (1.1)				
Moronidae						
white bass	6 (4.8)	3 (12.9)	6 (7.5)		14 (0.8)	
Centrarchidae						
black crappie		9 (3.2)	14 (1.1)		14 (0.8)	9 (3.5)
bluegill	7 (2.5)	7 (4.9)	1 (46.5)	5 (6.0)	3 (6.8)	1 (67.0)
bluegill X green sunfish						5 (14.0)
green sunfish	11 (0.8)		2 (23.0)	6 (4.5)	9 (2.0)	2 (45.0)
largemouth bass	9 (1.7)		10 (4.4)	9 (2.5)	5 (4.8)	4 (22.5)
orangespotted sunfish			10 (4.4)		11 (1.2)	
rock bass						8 (4.0)
Gobiidae						
round goby					14 (0.8)	9 (3.5)
Percidae						
sauger			13 (2.4)			
Sciaenidae						
freshwater drum	2 (11.5)	2 (20.4)	4 (15.6)		11 (1.2)	
Number of species accounting for 95 % of total catch	15	13	16	9	17	11

Table 8. Numbers of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2005.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.83	La Grange 5.58	Peoria 7.75	Starved Rock 2.00	Marseilles 2.42	Dresden 2.00	Overall $CPUE_N$ 26.58
Lepisosteidae								
shortnose gar		0.17	0.36					0.11
Clupeidae								
gizzard shad	43.00	75.99	32.08	101.68	82.00	79.75	43.50	71.37
skipjack herring		0.17	0.36	0.39		0.83		0.30
threadfin shad	1.00					0.41		0.08
Hiodontidae								
mooneye				0.13				0.04
Cyprinidae								
blacknose dace					1.00			0.08
bluntnose minnow				0.39	68.00	35.95	109.50	16.74
bullhead minnow	2.00	3.95	4.30	3.87	36.00	11.98		6.77
central stoneroller						0.83	0.50	0.11
common carp	3.00	2.40	5.56	5.81	0.50	3.72	3.00	4.10
common carp x goldfish				0.26			0.50	0.11
common shiner				0.13	3.50	0.41	2.50	0.53
creek chub					2.50			0.19
emerald shiner	17.00	35.51	12.54	8.39	98.50	17.77	18.00	23.89
golden shiner				0.13				0.04
goldfish				2.58		0.41		0.79
grass carp	1.00	0.17	0.18	0.65				0.30
red shiner		2.74	3.41	0.65	2.00	2.89		1.92
river shiner			0.18		3.50			0.30
sand shiner		0.34			2.00			0.23
silverband shiner	1.00		0.54					4.29
silver carp		5.83	9.50	3.48				0.04
silver chub		0.17						0.15
spotfin shiner		1.03		0.77	58.00	30.17	15.50	8.73
spottail shiner			0.90	6.84	4.00	3.72	1.50	2.93
Catostomidae								
bigmouth buffalo		0.69	1.08	7.74				2.66
black buffalo					2.00			0.15
golden redhorse			1.08	0.52		0.83		0.49
highfin carpsucker					0.50			0.04
quillback				0.13	0.50			0.08
river carpsucker		3.43	1.97	3.10	2.00	0.83	0.50	2.51
shorthead redhorse	1.00	1.72	0.18	0.52		2.48		0.83
smallmouth buffalo	6.00	1.72	1.43	13.94	2.50	2.07	0.50	5.38

Table 8. (continued)

Numbers of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2005.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.83	La Grange 5.58	Peoria 7.75	Starved Rock 2.00	Marseilles 2.42	Dresden 2.00	Overall $CPUE_N$ 26.58
Ictaluridae								
black bullhead				0.13				0.04
channel catfish	4.00	7.03	6.99	6.19	2.50	0.41	2.00	5.34
flathead catfish	1.00	2.57	5.38	1.81	0.50			2.29
tadpole madtom			0.18					0.04
Fudulidae								
blackstripe topminnow						1.24	6.00	0.56
Poeciliidae								
western mosquitofish			0.36				0.50	0.11
Atherinidae								
brook silverside	1.00	0.34						0.11
Moronidae								
white bass	2.00	8.40	4.30	5.55	1.00	0.41		4.55
white perch			0.18	0.13				0.08
yellow bass		0.34	0.36					0.15
Centrarchidae								
black crappie	1.00	0.86	1.25	4.65			2.00	1.99
bluegill	48.00	25.73	9.86	63.87	122.00	100.00	164.00	58.77
bluegill X green sunfish		0.34	0.18	1.68	3.00	3.31	12.50	2.07
green sunfish	17.00	1.54	1.61	24.65	19.50	6.61	37.00	13.36
largemouth bass	4.00	0.69	0.54	6.32	41.00	19.01	19.00	8.50
longear sunfish						0.41		0.04
orangespotted sunfish	11.00	4.63	0.72	9.81			3.50	4.70
pumpkinseed							1.50	0.11
rock bass							5.50	0.41
smallmouth bass				1.03	3.50	2.07	1.50	0.87
warmouth	1.00		1.08					0.26
white crappie		0.17	1.08	0.52		0.41		0.45
Percidae								
logperch				0.26	0.50			0.11
sauger		0.17		0.26				0.11
Sciaenidae								
freshwater drum	21.00	34.99	26.34	46.06	2.00	1.65		27.73
Total Number per hour	186.00	223.82	136.03	334.97	564.50	330.56	450.50	288.79
Number of species/hybrids	20/0	30/0	33/0	38/1	28/0	28/0	23/1	58/1

Table 9. Species ranks by relative abundance (number of fish collected per hour) for 2005 on the 6 reaches of the Illinois Waterway. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	1 (34.0)	1 (23.6)	1 (30.4)	3 (14.5)	2 (24.1)	3 (9.7)
Cyprinidae						
bullhead minnow	9 (1.8)	9 (3.2)	15 (1.2)	7 (6.4)	7 (3.6)	
bluntnose minnow				4 (12.0)	3 (10.9)	2 (24.3)
common carp		7 (4.1)	12 (1.7)		9 (1.1)	
common shiner				10 (.6)		
emerald shiner	2 (15.9)	3 (9.2)	7 (2.5)	2 (17.4)	6 (5.4)	6 (4.0)
red shiner	11 (1.2)	10 (2.5)			11 (.9)	
river shiner				10 (.6)		
silver carp	7 (2.6)	5 (7.0)	16 (1.0)			
spotfin shiner				5 (10.3)	4 (9.1)	7 (3.4)
spottail shiner			9 (2.0)	9 (.7)	9 (1.1)	
Catostomidae						
bigmouth buffalo		15 (.8)	8 (2.3)			
golden redhorse		15 (.8)				
river carpsucker	10 (1.5)	11 (1.4)				
smallmouth buffalo		13 (1.1)	5 (4.2)			
Ictaluridae						
channel catfish	6 (3.1)	6 (5.1)	11 (1.8)			
flathead catfish	12 (1.2)	8 (4.0)				
Fudulidae						
blackstripe topminnow						9 (1.3)
Moronidae						
white bass	5 (3.8)	9 (3.2)	13 (1.7)			
Centrarchidae						
black crappie		14 (.9)	14 (1.4)			
bluegill	4 (11.5)	4 (7.2)	2 (19.1)	1 (21.6)	1 (30.3)	1 (36.4)
bluegill X green sunfish					10 (1.0)	8 (2.8)
green sunfish		12 (1.2)	4 (7.4)	8 (3.5)	8 (2.0)	4 (8.2)
largemouth bass			10 (1.9)	6 (7.3)	5 (5.8)	5 (4.2)
orangespotted sunfish	8 (2.1)		6 (2.9)			
rock bass						10 (1.2)
smallmouth bass				10 (.6)		
warmouth		15 (.8)				
white crappie		15 (.8)				
Sciaenidae						
freshwater drum	3 (15.6)	2 (19.4)	3 (13.8)			
Number of species accounting for 95 % of total catch	12	19	16	12	12	10

Table 10. Number of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2006.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.75	La Grange 5.16	Peoria 7.88	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.29
Lepisosteidae								
shortnose gar		0.17	0.77					0.19
Clupeidae								
gizzard shad	37.00	44.87	43.35	69.26	21.00	9.60	11.50	43.90
skipjack herring		0.87	0.77	1.14				0.68
threadfin shad				0.63		0.40		0.23
Cyprinidae								
bluntnose minnow		0.17	0.19		48.00	35.60	62.50	11.87
bullhead minnow	7.00	2.61	6.97	7.48	77.50	17.60		12.02
central stoneroller				0.13		2.00		0.23
common carp	2.00	2.43	6.77	10.40		1.20	7.00	5.71
common shiner						0.40	0.50	0.08
emerald shiner	13.00	42.43	31.74	25.88	474.00	96.00	30.50	71.28
golden shiner				0.13				0.04
goldfish			0.77	1.78			1.00	0.76
grass carp			0.39	0.51	0.50			0.27
red shiner		0.35	2.52					0.57
river shiner		0.35	0.19					0.11
sand shiner		1.22		0.25				0.34
silverband shiner				0.13				0.04
silver carp		1.22	16.26	1.52				3.92
silver chub	3.00			0.13				0.15
spotfin shiner		0.17		1.01	64.00	45.20	4.00	9.81
spottail shiner			0.19	3.04		0.80	1.00	1.10
Catostomidae								
bigmouth buffalo	1.00	1.39	0.39	9.51				3.27
black buffalo				0.38				0.11
golden redhorse				1.40			1.00	0.49
highfin carpsucker		0.17		0.13				0.08
quillback		0.17	0.19	0.13				0.11
river carpsucker	1.00	1.39	2.13	5.45	1.00	0.40		2.51
shorthead redhorse	1.00	0.70	1.55	0.51			0.50	0.68
silver redhorse		0.17						0.04
smallmouth buffalo	2.00	1.04	3.48	14.46	2.50	0.40	2.00	5.71
Ictaluridae								
brown bullhead				0.13				0.04
channel catfish	5.00	5.39	4.06	4.82	6.50	1.60	5.00	4.64
flathead catfish	1.00		3.10		0.50			0.68
yellow bullhead				0.38				0.11

Table 10. (continued)

Number of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2006.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.75	La Grange 5.16	Peoria 7.88	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.29
Fudulidae								
banded killifish					1.00			0.08
blackstripe topminnow						1.20	1.00	0.19
Poeciliidae								
western mosquitofish		0.17		0.38			0.50	0.19
Gobiidae								
round goby					0.5			0.04
Moronidae								
white bass	5.00	5.91	5.42	3.04	1.00	0.40		3.58
white perch			0.77					0.15
yellow bass			0.19					0.04
yellow bass x white perch			0.39					0.08
Centrarchidae								
black crappie	2.00	1.04	0.97	0.76	0.50	2.00	1.00	1.03
bluegill	72.00	16.87	11.61	64.44	46.00	39.20	47.50	38.87
bluegill X green sunfish		0.52		0.76	0.50	2.00	9.50	1.29
green sunfish	32.00	1.91	0.58	39.96	5.50	6.40	33.50	17.31
largemouth bass	6.00	1.91	1.55	7.10	3.50	6.80	8.50	4.64
longear sunfish				0.13		2.00		0.23
orangespotted sunfish	56.00	3.30	9.10	18.39	0.50	0.40	0.50	10.27
redear sunfish							0.50	0.04
rock bass							0.50	0.04
smallmouth bass				0.89	2.50	0.80	1.00	0.61
warmouth				0.38				0.11
white crappie	1.00			0.25				0.11
Esocidae								
grass pickerel						0.40		0.04
Percidae								
johnny darter			0.19					0.04
logperch				0.38				0.11
mud darter				0.13				0.04
sauger			0.19	0.51				0.19
slenderhead darter				0.13				0.04
walleye				0.13				0.04
Sciaenidae								
freshwater drum	20.00	12.35	24.39	13.57	3.00	3.20	0.50	12.89
Total Number per hour	267.00	151.30	181.16	312.05	760.00	276.00	231.00	274.06
Number of species/hybrids	19/0	28/1	31/1	44/1	20/1	24/1	23/1	60/2

Table 11. Fish species ranks by relative abundance (number of fish collected per hour) for 2006 on the 6 reaches of the Illinois Waterway. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	1 (29.7)	1 (23.9)	1 (22.2)	6 (2.8)	6 (3.5)	5 (5.0)
Cyprinidae						
bluntnose minnow				4 (6.3)	4 (12.9)	1 (27.1)
bullhead minnow	8 (1.7)	7 (3.8)	10 (2.4)	2 (10.2)	5 (6.4)	
common carp	9 (1.6)	8 (3.7)	8 (3.3)			8 (3.0)
emerald shiner	2 (28.0)	2 (17.5)	4 (8.3)	1 (62.4)	1 (34.8)	4 (13.2)
red shiner		13 (1.4)				
silver carp		4 (9.0)				
spotfin shiner				3 (8.4)	2 (16.4)	10 (1.7)
spottail shiner			14 (1.0)			
Catostomidae						
bigmouth buffalo	12 (0.9)		9 (3.0)			
river carpsucker	11 (1.3)	14 (1.2)	12 (1.7)			
smallmouth buffalo		11 (1.9)	6 (4.6)			
Ictaluridae						
channel catfish	6 (3.6)	10 (2.2)	13 (1.5)			9 (2.2)
flathead catfish		12 (1.7)				
Moronidae						
white bass	5 (3.9)	9 (3.0)	14 (1.0)			
Centrarchidae						
bluegill	3 (11.1)	5 (6.4)	2 (20.6)	5 (6.1)	3 (14.2)	2 (20.6)
bluegill X green sunfish						6 (4.1)
green sunfish	10 (1)		3 (12.8)		8 (2.3)	3 (14.5)
largemouth bass	10 (1.3)		11 (2.3)		7 (2.5)	7 (3.7)
orangespotted sunfish	7 (2.2)	6 (5.0)	5 (5.9)			
Sciaenidae						
freshwater drum	4 (8.2)	3 (13.5)	7 (4.3)		9(1.2)	
Number of species accounting for 95 % of total catch	13	14	15	6	9	10

Table 12. Number of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2007.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.42	La Grange 5.50	Peoria 7.92	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.34
Amiidae								
bowfin		0.18						0.04
Catastomidae								
bigmouth buffalo		0.92	0.55	8.21				2.77
black buffalo		0.18	0.55		0.50			0.19
golden redhorse		0.18		0.63	3.50	2.00	2.00	0.84
highfin carpsucker					0.50			0.04
northern hogsucker				0.63				0.19
quillback						0.40		0.04
river carpsucker	1.00	0.37	0.73	1.14	1.50	1.20		0.84
shorthead redhorse		0.37	0.91	0.13	6.00	0.80	0.50	0.87
silver redhorse							0.50	0.04
smallmouth buffalo	1.00		4.55	16.80	2.00	1.60	1.50	6.45
Centrarchidae								
black crappie	4.00	3.32	1.09	2.65	0.50	0.80	0.50	2.01
bluegill	50.00	10.34	4.36	60.38	16.00	20.40	116.50	35.08
bluegill x green sunfish		0.18	0.18	0.76	0.50		15.50	1.52
green sunfish	9.00	0.37	1.64	24.76	3.50	7.60	39.50	12.19
largemouth bass	1.00	1.29	0.18	8.97	8.50	8.80	35.00	7.18
longear sunfish					1.50			0.11
orange spotted sunfish	7.00	2.03	12.91	28.93		1.60	2.50	12.41
pumpkinseed				1.14	1.50	4.00	2.50	1.03
redear sunfish				0.25				0.08
rock bass				0.13	0.50	0.80	8.00	0.76
smallmouth bass	1.00	0.37		1.52	4.50	2.00	7.50	1.67
warmouth	1.00			0.25				0.11
white crappie			0.18	0.25				0.11
Clupeidae								
gizzard shad	146.00	8.86	27.82	31.33	5.00	5.20	57.00	27.79
skipjack herring			0.18	0.76				0.27
threadfin shad			0.36					0.08
Cyprinidae								
bighead carp					1.00			0.08
bluntnose minnow			0.18		85.00	37.20	47.00	13.59
bullhead minnow	7.00	11.26	4.73	19.45	15.00	5.60		11.09
central stoneroller						1.60		0.15
common carp		1.11	10.00	16.42	3.00	2.80	8.50	8.39
common carp x goldfish		0.18						0.04
emerald shiner	23.00	25.48	14.91	18.44	105.50	73.20	3.50	29.99
golden shiner				0.88			5.50	0.68
goldfish				1.39		0.40	8.00	1.06
grass carp			0.73	0.51				0.30
red shiner			3.27	0.38				0.80
river shiner		0.37	0.18					0.11
silver carp	3.00	4.62	189.09	234.06				110.90
silver chub		0.37	0.18	0.25	0.50			0.23
silverband shiner		1.66	0.18				2.00	0.53
southern redbelly dace				0.13				0.04
spotfin shiner	3.00	1.11		2.91	71.00	44.40		10.82
spottail shiner		0.18		3.41	3.00	2.40	0.50	1.56

Table 12. (continued)

Number of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2007.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 5.42	La Grange 5.50	Peoria 7.92	Starved Rock 2.00	Marseilles 2.50	Dresden 2.00	Overall $CPUE_N$ 26.34
Fundulidae								
blackstripe topminnow					0.50	0.40		0.08
Gobiidae								
round goby				0.25	0.50	1.60		0.27
Hiodontidae								
goldeye		0.18						0.04
Ictaluridae								
brown bullhead				0.25				0.08
channel catfish	4.00	7.02	13.09	7.71	7.50	3.60	7.00	8.09
flathead catfish	2.00	0.92	0.73	0.63				0.61
tadpole madtom							0.50	0.04
yellow bullhead				0.13			0.50	0.08
Lepisosteidae								
shortnose gar		0.55	0.18					0.15
Moronidae								
white bass		7.02	9.82	4.93	1.50	0.80		5.16
white perch			0.36					0.08
yellow bass			1.27		1.50			0.38
yellow bass x white perch			0.18					0.04
Percidae								
logperch				0.51				0.15
mud darter		0.18						0.04
sauger		0.18	0.55					0.15
Poeciliidae								
western mosquitofish			8.73	0.51				1.97
Sciaenidae								
freshwater drum	2.00	14.22	7.82	16.17	1.50	8.00	1.00	10.44
Total Number per hour	265.00	105.54	322.36	518.69	353.00	239.20	373.00	332.88
Number of species/hybrids	19/0	30/2	33/2	40/1	29/1	27/0	24/1	60/3

Table 13. Fish species ranks by relative abundance (number of fish collected per hour) for 2007 on the 6 reaches of the Illinois Waterway. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Catostomidae						
bigmouth buffalo	15 (0.9)		12 (1.6)			
golden redhorse				11 (1.0)	14 (0.8)	
shorthead redhorse				8 (1.7)		
smallmouth buffalo		11 (1.4)	8 (3.2)			
Centrarchidae						
bluegill	4 (10.3)	12 (1.4)	2 (11.6)	4 (4.5)	4 (8.5)	1 (31.2)
bluegill x green sunfish						6 (4.2)
black crappie	9 (3.3)					
green sunfish			5 (4.8)	11 (1.0)	7 (3.2)	4 (10.6)
largemouth bass	12 (1.3)		11 (1.7)	6 (2.4)	5 (3.7)	5 (9.4)
orange spotted sunfish	10 (2.0)	5 (4.0)	4 (5.6)			
pumpkinseed					10 (1.7)	
rock bass						8 (2.1)
smallmouth bass				10 (1.3)	14 (0.8)	10(2.0)
Clupeidae						
gizzard shad	5 (8.9)	2 (8.6)	3 (6.0)	9 (1.4)	9 (2.2)	2 (15.3)
Cyprinidae						
bluntnose minnow				2 (24.1)	3 (15.6)	3 (12.6)
bullhead minnow	3 (11.3)	10 (1.5)	6 (3.8)	5 (4.2)	8 (2.3)	
common carp	13 (1.1)	6 (3.1)	9 (3.2)	13 (0.8)	12 (1.2)	7 (2.3)
emerald shiner	1 (24.1)	3 (4.6)	7 (3.6)	1 (29.9)	1 (30.6)	
golden shiner						12 (1.5)
goldfish						8 (2.1)
silverband shiner	11 (1.7)					
silver carp	8 (4.6)	1 (58.7)	1 (45.1)			
spotfin shiner	13 (1.1)			3 (20.1)	2 (18.6)	
spottail shiner				13 (0.8)	13 (1.0)	
Ictaluridae						
channel catfish	6 (7.0)	4 (4.1)	13 (1.5)	7 (2.1)	11 (1.5)	11 (1.9)
flathead catfish	15 (0.9)					
Moronidae						
white bass	6 (7.0)	7 (3.1)				
Poeciliidae						
western mosquitofish		8 (2.7)				
Sciaenidae						
freshwater drum	2 (14.2)	9 (2.4)	10 (3.1)		6 (3.3)	
Number of species accounting for 95 % of total catch	16	12	13	14	15	12

Table 14. Number of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2008.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 4.68	La Grange 5.58	Peoria 8.00	Starved Rock 2.00	Marseilles 2.42	Dresden 2.00	Overall $CPUE_N$ 24.68
Amiidae								
bowfin		0.54	0.36					0.16
Atherinidae								
brook silverside						0.83		0.08
Catastomidae								
bigmouth buffalo	2.00	0.27	0.54	8.00				2.84
black buffalo			0.18	0.13				0.08
golden redhorse				0.75	0.50	0.83		0.36
highfin carpsucker				0.25				0.08
river carpsucker		0.54	1.61	1.63		1.24		1.09
shorthead redhorse		1.36	3.22	0.50	1.50	0.41		1.26
smallmouth buffalo	8.00	3.80	7.34	8.38	3.00	2.48	0.50	5.79
Centrarchidae								
black crappie	1.00	0.81	7.52	4.63	1.50	1.24	0.50	3.65
bluegill	12.00	12.76	25.79	62.88	19.50	23.59	169.50	46.23
bluegill x green sunfish			0.18	1.25			7.00	1.01
green sunfish	10.00		6.45	16.00	4.50	2.90	26.50	9.85
largemouth bass	4.00	5.97	24.00	7.63	4.50	10.76	25.50	12.44
longear sunfish						1.24	0.50	0.16
orange spotted sunfish	4.00	0.27	15.94	18.50		2.48	7.50	10.66
pumpkinseed			0.18	0.13	2.00	4.97	0.50	0.77
redear sunfish		0.27				0.41		0.08
rock bass							8.00	0.65
smallmouth bass	1.00			0.88	2.50	1.24	6.00	1.13
warmouth		0.27	0.54	0.13				0.20
white crappie			2.15	0.25				0.57
Clupeidae								
gizzard shad	55.00	42.35	18.09	159.38	56.50	27.31	18.00	73.01
skipjack herring		0.54	0.90	0.25	0.50	0.41		0.45
threadfin shad	1.00	2.44	13.61	1.13	1.00		0.50	3.97
Cyprinidae								
bighead carp	1.00				1.00			0.04
bluntnose minnow					61.00	64.55	75.50	17.38
bullhead minnow	1.00	1.63	0.72	2.25	30.50	12.83	3.50	5.19
central stoneroller				0.13	5.00	1.24		0.57
common carp	2.00	10.32	9.67	12.13	3.50	4.97	5.50	8.95
emerald shiner		2.44	3.76	33.88	185.00	20.28	5.00	29.58
golden shiner				0.13				0.04
goldfish			2.15	1.00		0.41	3.00	1.09
grass carp			0.90	1.63	0.50			0.77
longnose dace						0.83		0.08
red shiner			0.18	1.00				0.36
river shiner					4.00			0.32
silver carp	4.00	9.77	8.42	48.88				19.37
silver chub			1.25					0.32
silverband shiner			0.18					0.04
spotfin shiner				1.50	79.50	76.55	10.50	15.28
spottail shiner				7.13	6.00	1.66	0.50	3.00

Table 14. (continued)

Number of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2008.

	Reach and Hours Fished							
Species	Reach 26 1.00	Alton 3.68	La Grange 5.58	Peoria 8.00	Starved Rock 2.00	Marseilles 2.42	Dresden 2.00	Overall $CPUE_N$ 24.68
Esocidae								
grass pickerel						0.41		0.04
Fundulidae								
blackstripe topminnow				0.25		1.24	1.50	0.32
Gobiidae								
round goby					1.00	1.24		0.20
Hiodontidae								
mooneye			0.18					0.04
Ictaluridae								
black bullhead			2.51	0.88				0.85
brown bullhead				0.25				0.08
channel catfish	6.00	18.73	20.78	2.50	4.50	2.07	5.00	9.52
flathead catfish	2.00	4.89	3.76	0.75	0.50			1.94
tadpole madtom			0.18					0.04
yellow bullhead				0.63			3.00	0.45
Lepisosteidae								
longnose gar			0.18					0.04
spotted gar	1.00	0.27	0.18					0.04
Moronidae								
white bass	1.00	7.87	17.01	4.88		0.41		6.69
yellow bass			1.97	0.13				0.49
Percidae								
blackside darter					0.50	0.41	1.00	0.16
logperch				0.50		0.41	0.50	0.24
mud darter						0.41		0.04
sauger		1.63	1.97	1.25				1.09
slenderhead darter						0.41		0.04
Poeciliidae								
western mosquitofish				0.13				0.04
Sciaenidae								
freshwater drum	3.00	36.11	82.57	16.25	0.50	0.83	1.00	29.66
Total Number per hour	119.00	166.03	287.28	430.63	479.50	273.55	386.00	330.92
Number of species/hybrids	19/0	24/0	37/1	42/1	26/0	36/0	25/1	62/1

Table 15. Fish species ranks by relative abundance (number of fish collected per hour) for 2008 on the 6 reaches of the Illinois Waterway. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Catostomidae						
bigmouth buffalo			10 (1.9)			
shorthead redhorse		16 (1.1)				
smallmouth buffalo	10 (2.3)	12 (2.6)	9 (1.9)		11 (0.9)	
Centrarchidae						
black crappie		11 (2.6)	14 (1.1)			
bluegill	4 (7.7)	2 (9.0)	2 (14.6)	6 (4.1)	4 (8.6)	1 (43.9)
bluegill x green sunfish						9 (1.8)
green sunfish		13 (2.2)	7 (3.7)	9 (0.9)	10 (1.1)	3 (6.9)
largemouth bass	8 (3.6)	3 (8.4)	11 (1.8)	9 (0.9)	7 (3.9)	4 (6.6)
orange spotted sunfish		7 (5.5)	5 (4.3)		11 (0.9)	8 (1.9)
pumpkinseed					8 (1.8)	
rock bass						7 (2.1)
smallmouth bass						10 (1.6)
white crappie		18 (0.7)				
Clupeidae						
gizzard shad	1 (25.5)	5 (6.3)	1 (37.0)	4 (11.8)	3 (10.0)	5 (4.7)
threadfin shad	11 (1.5)	8 (4.7)				
Cyprinidae						
bluntnose minnow				3 (12.7)	2 (23.6)	2 (19.6)
bullhead minnow				5 (6.4)	6 (4.7)	
central stoneroller				8 (1.0)		
common carp	5 (6.2)	9 (3.4)	8 (2.8)		8 (1.8)	11 (1.4)
emerald shiner	11 (1.5)	14 (1.3)	4 (7.9)	1 (38.6)	5 (7.4)	12 (1.3)
goldfish		18 (0.7)				
silver carp	6 (5.9)	10 (2.9)	3 (11.3)			
spotfin shiner				2 (16.6)	1 (27.9)	6 (2.7)
spottail shiner			12 (1.7)	7 (1.3)	14 (0.6)	
Ictaluridae						
black bullhead		17 (0.9)				
channel catfish	3 (11.3)	4 (7.2)		9 (0.9)	13 (0.8)	12 (1.3)
flathead catfish	9 (2.9)	14 (1.3)				
Moronidae						
white bass	7 (4.7)	6 (5.9)	13 (1.1)			
Sciaenidae						
freshwater drum	2 (21.8)	1 (28.8)	6 (3.8)			
Number of species accounting for 95 % of total catch	12	19	14	11	14	13

$CPUE_N$ of Five Common Sport Fish Species.

Catch rates in numbers of individuals collected per hour by electrofishing for the top five most numerically abundant sport fish species (bluegill, largemouth bass, channel catfish, white bass, and black crappie) are shown in Figures 2 through 6 for the lower, middle, and upper Illinois River Waterway reaches. Bluegill were the most numerically abundant species overall from 2004-2008. Bluegill exhibited an increasing trend in the upper waterway from 2004-2008, but a slight decline in the lower waterway from 2005-2008 (Figure 2). The highest bluegill $CPUE_N$ occurred in the upper waterway in 2005 (126.9 fish per hour), while the lowest bluegill $CPUE_N$ occurred in the lower waterway in 2004 (2.5 fish per hour). Overall the catches of bluegill have been much higher in the upper and middle waterway than in the lower waterway. Largemouth bass were the second most collected sport fish during 2004-2008. Catches of largemouth bass have been highest in the upper waterway reaches for most of 2004-2008 (Figure 3). Largemouth bass reached the highest recorded $CPUE_N$ in F-101-R sampling in 2005 with a catch rate 25.9 fish per hour in the upper waterway. The collection of largemouth bass observed in 2007 in the upper waterway was the second highest $CPUE_N$ observed in F-101-R sampling with a catch rate of 16.8 fish per hour. Though catches of largemouth bass for the middle and lower waterway show an increasing trend from 2004-2008, collections for this fish species were among the lowest recorded in F-101-R sampling. The catch of largemouth bass in the lower waterway in 2005 (0.7 fish per hour) was the lowest recorded for this species in F-101-R sampling. Channel catfish was third in overall $CPUE_N$ for sport fish and were found in greater numbers in the lower waterway for most years (2004-2008; Figure 4). During

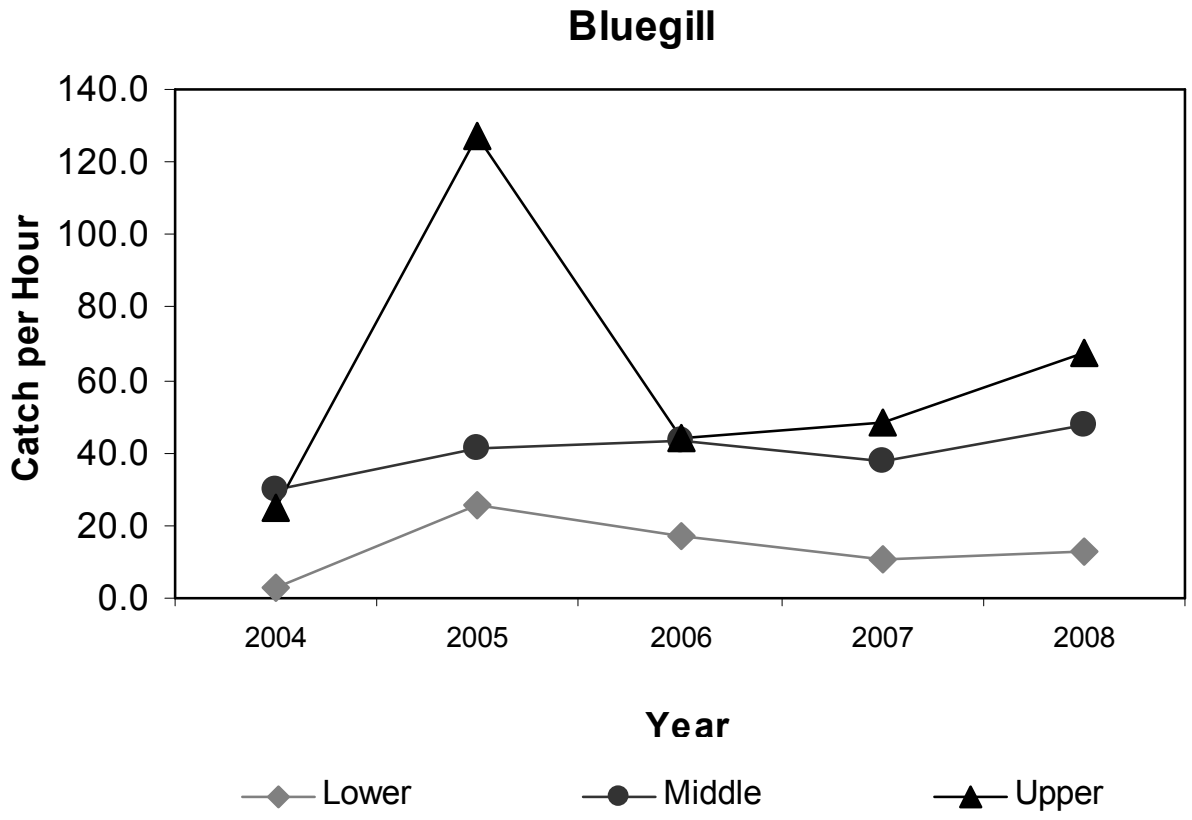

Figure 2. Catch per hour of bluegill from 2004 through 2008 in the lower (Alton Reach), middle (La Grange and Peoria Reaches), and upper (Starved Rock, Marseilles, and Dresden reaches) Illinois River Waterway.

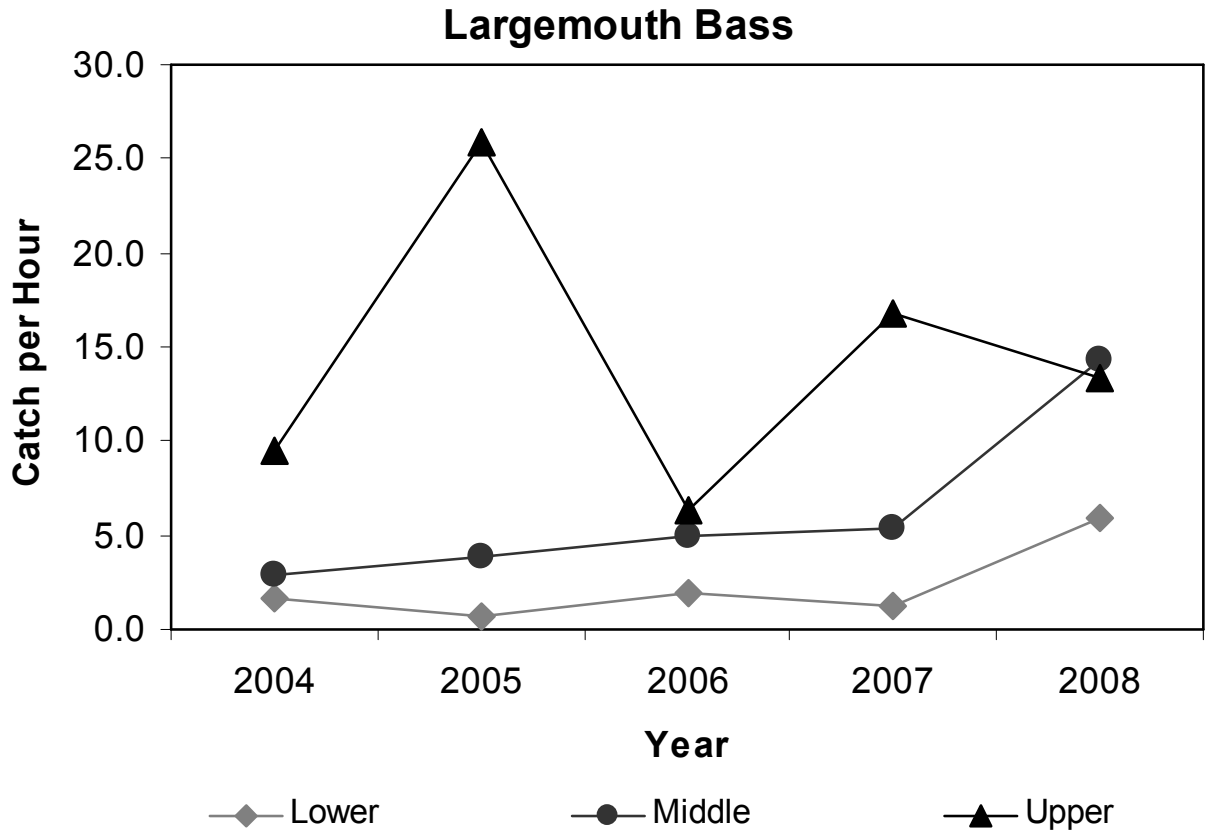

Figure 3. Catch per hour of largemouth bass from 2004 through 2008 in the lower (Alton Reach), middle (La Grange and Peoria Reaches), and upper (Starved Rock, Marseilles, and Dresden reaches) Illinois River Waterway.

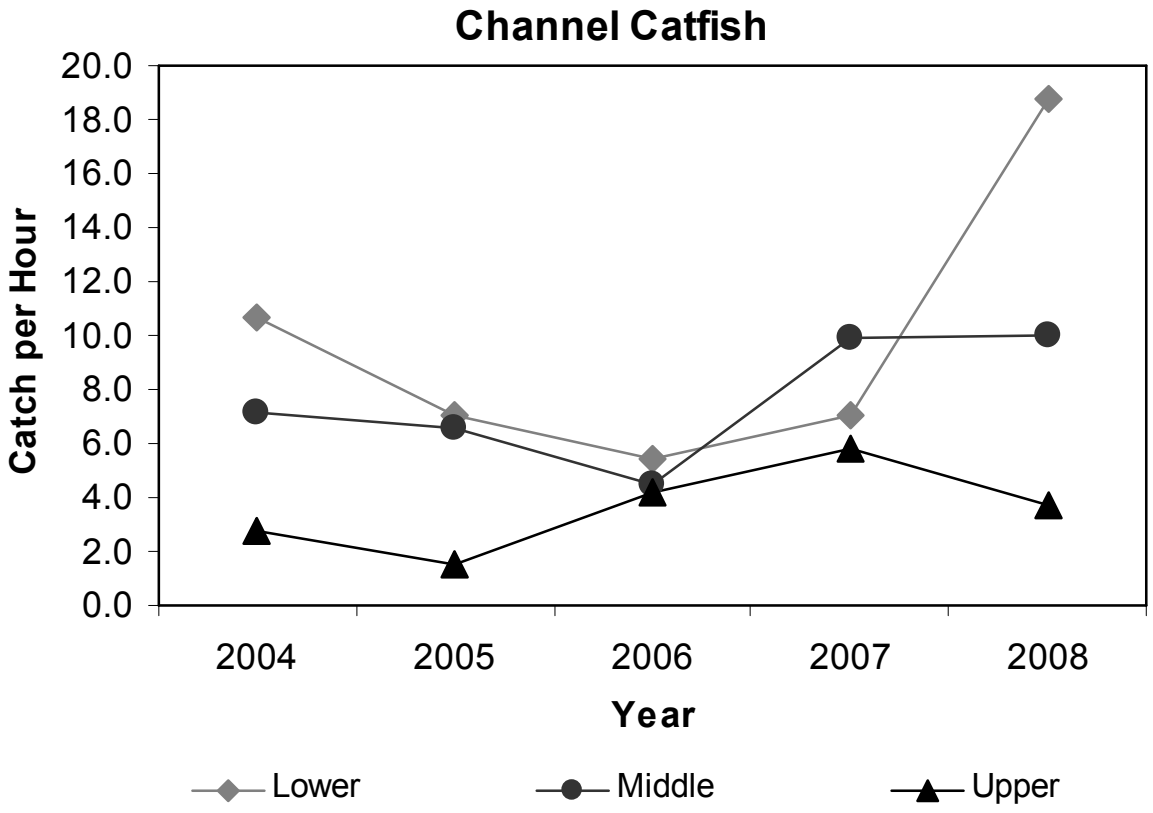

Figure 4. Catch per hour of channel catfish from 2004 through 2008 in the lower (Alton Reach), middle (La Grange and Peoria Reaches), and upper (Starved Rock, Marseilles, and Dresden reaches) Illinois River Waterway.

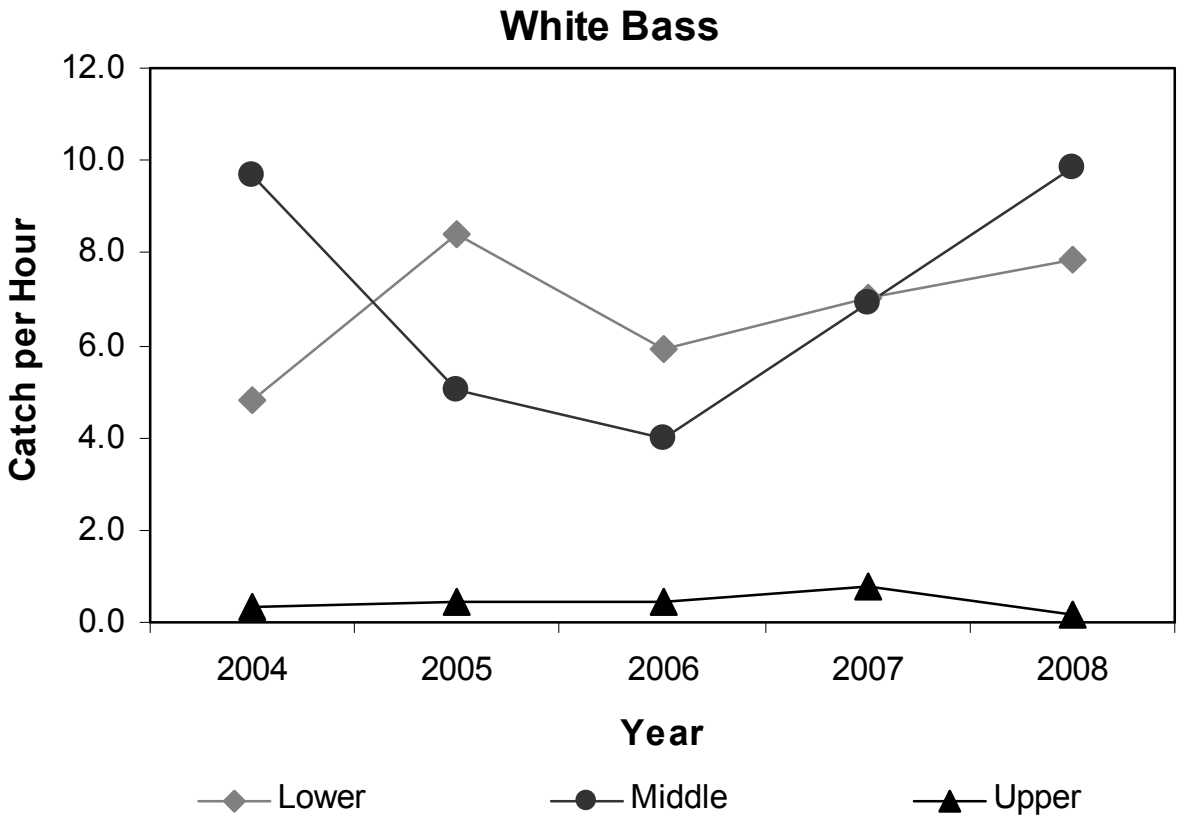

Figure 5. Catch per hour of white bass from 2004 through 2008 in the lower (Alton Reach), middle (La Grange and Peoria Reaches), and upper (Starved Rock, Marseilles, and Dresden reaches) Illinois River Waterway.

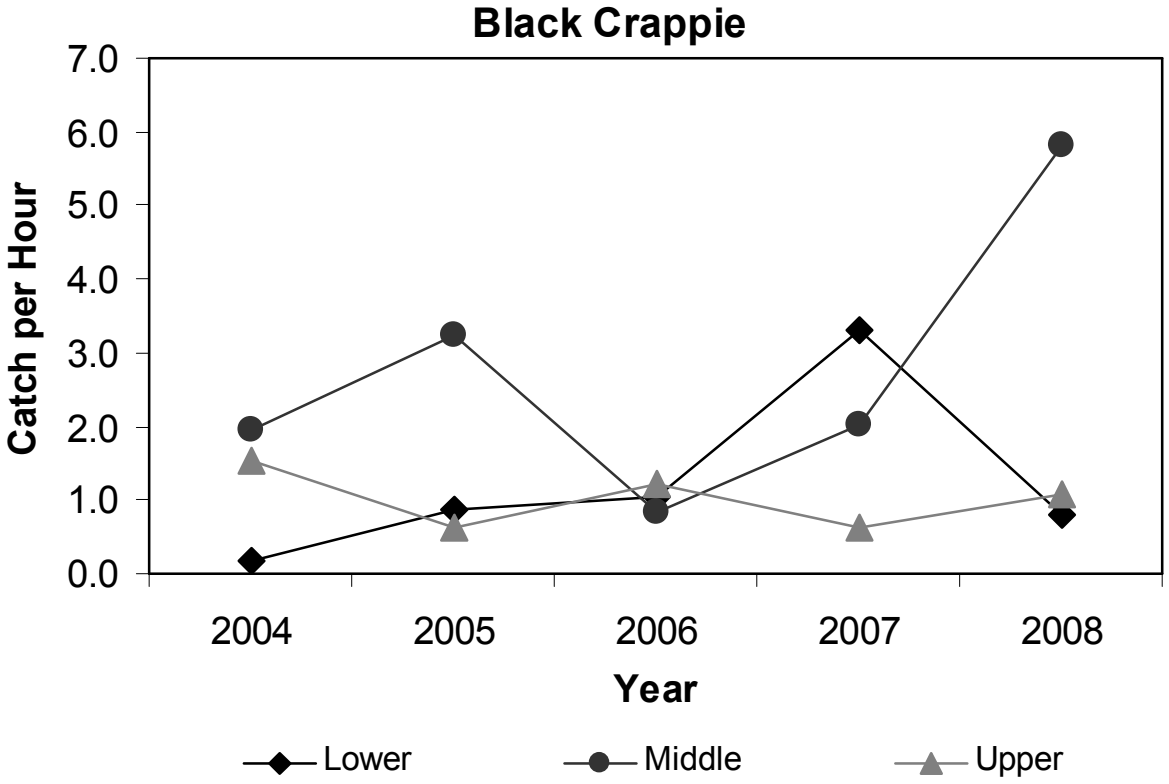

Figure 6. Catch per hour of black crappie from 2004 through 2008 in the lower (Alton Reach), middle (La Grange and Peoria Reaches), and upper (Starved Rock, Marseilles, and Dresden reaches) Illinois River Waterway.

the 2004-2008 period, channel catfish catches were the highest recorded for the middle (10.0 fish per hour, 2008) and upper waterway (5.8 fish per hour, 2007) and the second highest recorded in the lower waterway (18.7 fish per hour, 2008) in F-101-R sampling. The lower waterway also recorded the lowest $CPUE_N$ ever during F-101-R for this river segment when 5.4 fish per hour were collected in 2006. White bass ranked fourth among sport fish in overall $CPUE_N$ and were collected in highest numbers in the lower and middle waterway for all years, 2004-2008 (Figure 5). The largest collection in $CPUE_N$ for white bass (9.9 fish per hour) occurred in 2008 in the middle waterway. The white bass collection for 2005 in the lower waterway was the second highest ever recorded for this river segment in F-101-R sampling with a $CPUE_N$ of 8.4 fish per hour. Black crappie ranked fifth in overall $CPUE_N$ for sport fish and were generally collected in highest numbers in the middle waterway (Figure 6). The single largest collection of black crappie (5.8 fish per hour) occurred in 2008 in the middle waterway, while the lowest collection (0.2 fish per hour) occurred in 2004 in the lower waterway. Additional sport fish species, such as flathead catfish and smallmouth bass, had notable collection years during the 2004-2008 segment. Flathead catfish catches are generally low throughout the waterway, but were the highest ever recorded in F-101-R sampling in the lower waterway (4.9 fish per hour) in 2008 and the middle waterway (3.3 fish per hour) in 2005. Smallmouth bass catches are also generally low throughout the waterway. In 2007, smallmouth bass collections were the highest ever recorded in F-101-R sampling in the middle (0.9 fish per hour) and upper waterway (4.5 fish per hour).

D. $CPUE_W$ in Pounds Collected per Hour by Reach

Catch rates in pounds of fish collected per hour ($CPUE_W$) were examined to provide an estimation of fish biomass and production of each Illinois Waterway reach. Overall, $CPUE_W$ ranged from 62.4 pounds per hour in 2004 to 102.7 pounds per hour in 2007 (Tables 16-25). As in past segments, Peoria Reach consistently provided the highest catches in weight with a low $CPUE_W$ of 83.7 pounds per hour and a high $CPUE_W$ of 196.4 in 2007(Tables 16 and 22). The lowest catch weights each year were generally found in the Starved Rock Reach ($CPUE_W$ 10.5-56.8) and Marseilles Reach ($CPUE_W$ 11.8-38.3) in the Upper Waterway.

The following summary is restricted to species that each separately accounted for over 10% of the total catch in weight and to species that were of special significance. A 95% list was produced for each reach, in which species were ranked by relative abundance (pounds per hour) and added to the list until 95% of the total catch rate for that reach was obtained. Overall, these data indicate that in terms of relative biomass, the fish communities along the entire Illinois Waterway were dominated by common carp and silver carp. In addition to these species, the Lower and Middle Waterway continued to have high catch weights of bigmouth buffalo and channel catfish, while the Upper Waterway had high catch weights of channel catfish and largemouth bass. Common carp ranked first by relative abundance in pounds of fish collected per hour for all reaches but Starved Rock Reach in 2004; Marseilles Reach in 2005; Marseilles and Dresden Reaches in 2006; Dresden Reach in

Table 16. Pounds of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2004. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall $CPUE_N$
Species	1.00	6.00	5.30	8.00	2.00	2.50	2.00	26.80
Clupeidae								
gizzard shad	1.35	1.87	..95	1.09	1.24	4.40	7.50	26.19
skipjack herring			0.02	0.01	0.04			0.01
threadfin shad		0.00	0.01	0.00			0.00	0.00
Cyprinidae								
bighead carp		0.19						0.04
bluntnose minnow					0.01	0.07	0.11	0.02
bullhead minnow	0.00	0.00	0.00	0.00	0.02	0.01		0.00
central stoneroller							0.00	0.00
common carp	7.23	24.56	36.87	18.89	1.44	7.27	24.49	21.31
emerald shiner	0.04	0.02	0.02	0.01	0.06	0.04	0.00	0.02
golden shiner				0.01				0.00
goldfish		0.01	0.10	0.00		0.13		0.03
grass carp		3.55	3.12	1.41				1.83
red shiner				0.00				0.00
ribbon shiner							0.00	0.00
silverband shiner		0.01	0.00					0.00
silver carp		14.55	6.10	3.74				5.58
silver chub	0.00	0.00		0.01				0.00
spotfin shiner				0.00	0.04	0.01	0.00	0.01
spottail shiner	0.00			0.01		0.01		0.00
Catostomidae								
bigmouth buffalo		3.12	6.44	15.99				6.74
black buffalo		0.65						0.15
golden redhorse				0.14	0.52	0.13		0.09
river carpsucker	0.10	0.73	0.03	3.12	0.23			1.12
shorthead redhorse		0.49	0.12	0.07				0.15
silver redhorse				0.01				0.00
smallmouth buffalo	0.05	2.00	3.75	14.24	1.16	2.09		5.73
Ictaluridae								
channel catfish	5.74	6.76	11.07	8.64	1.76	1.48	6.34	7.24
flathead catfish	0.09	0.41	4.36	0.06				0.98
freckled madtom		0.00						0.00
yellow bullhead				0.08			0.18	0.04
Moronidae								
white bass	0.17	2.39	2.93	2.78		0.16		1.97
white perch				0.00				0.00
yellow bass			0.01			0.01		0.00

Table 16. (continued)
Pounds of individuals of each fish species collected per hour of electrofishing (CPUEn) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2004. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
					Starved			Overall
	Reach 26	Alton	La Grange	Peoria	Rock	Marseilles	Dresden	$CPUE_N$
Species	1.00	6.00	5.30	8.00	2.00	2.50	2.00	26.80
Centrarchidae								
black crappie	1.27	0.00	0.62	0.36	0.22	0.46	2.17	0.50
bluegill	2.26	0.17	0.21	3.33	0.41	0.44	4.55	1.57
bluegill X green sunfish				0.01			1.51	0.11
green sunfish	0.11	0.01		1.73	0.16	0.05	2.62	0.74
largemouth bass	1.18	1.28	0.05	2.30	0.39	2.51	11.94	2.18
longear sunfish					0.03			0.00
orangespotted sunfish	0.11	0.01	0.00	0.05		0.02		0.02
redear sunfish				0.06				0.02
rock bass							0.36	0.03
smallmouth bass				0.16	0.44	0.01	0.66	0.13
white crappie				0.09				0.03
Atherinidae								
brook silverside							0.00	0.00
Gobiidae								
round goby						0.01	0.02	0.00
Percidae								
logperch		0.00		0.00				0.00
sauger				0.45				0.13
slenderhead darter			0.00					0.00
walleye				0.50	0.83			0.21
Esocidae								
grass pickerel						0.02		0.00
Poeciliidae								
western mosquitofish			0.00					0.00
Fundulidae								
blackstripe topminnow						0.00	0.00	0.00
Sciaenidae								
freshwater drum	3.74	0.94	3.10	4.65		0.71		2.42
Total Number per hour	23.44	63.74	79.74	83.74	10.46	16.60	56.08	62.43

Table 17. Species ranks by relative biomass in pounds of fish collected per hour for 2004. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	8 (1.9)			1 (2.7)	5 (0.9)	7 (1.1)
Cyprinidae						
common carp	1 (24.6)	1 (36.9)	1 (19.0)	3 (1.4)	1 (7.3)	1 (24.5)
grass carp	4 (3.5)	7 (3.1)				
silver carp	2 (14.5)	4 (6.16)	6 (3.7)			
Catostomidae						
bigmouth buffalo	5 (3.1)	3 (6.4)	2 (16.0)			
golden redhorse				6 (0.5)		
river carpsucker			8 (3.1)	10 (0.2)		
smallmouth buffalo		6 (3.7)	3 (14.2)	4 (1.2)	3 (2.1)	
Ictaluridae						
channel catfish	3 (6.8)	2 (11.1)	4 (8.6)	2 (1.8)	4 (1.5)	3 (6.3)
flathead catfish		5 (4.4)				
Moronidae						
white bass	6 (2.4)		9 (2.8)			
Centrarchidae						
black crappie					7 (0.5)	6 (2.2)
bluegill			7 (3.3)	8 (0.4)	8 (0.4)	4 (4.5)
green sunfish			11 (1.7)			5 (2.6)
largemouth bass	9 (1.3)		10 (2.3)	9 (0.4)	2 (2.5)	2 (11.9)
smallmouth bass				7 (0.4)		
Percidae						
walleye				5 (0.8)		
Sciaenidae						
freshwater drum	10 (0.9)	8 (3.1)	5 (4.6)		6 (0.7)	
Number of species accounting for 95 % of total catch	10	8	11	10	8	7

Table 18. Pounds of each fish species collected per hour of electrofishing ($CPUE_W$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2005. Pounds per hour less than 0.01 but greater than zero are indicated by 0.00.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall CPUE
Species	1.00	5.83	5.58	7.75	2.00	2.42	2.00	26.58
Lepisosteidae								
shortnose gar		0.18	0.26					0.09
Hiodontidae								
mooneye				0.01				0.00
Clupeidae								
gizzard shad	3.95	2.51	0.86	4.36	3.45	3.59	4.49	3.08
skipjack herring		0.01	0.02	0.02		0.05		0.02
threadfin shad	0.06					0.01		0.00
Cyprinidae								
blacknose dace					0.01			0.00
bluntnose minnow				0.00	0.21	0.13	0.41	0.06
bullhead minnow	0.01	0.01	0.01	0.01	0.10	0.03		0.02
central stoneroller						0.01	0.01	0.00
common carp	6.16	6.38	10.58	13.55	1.12	9.28	6.38	9.21
common carp x goldfish				0.26			1.12	0.16
common shiner				0.00	0.03	0.01	0.05	0.01
creek chub					0.02			0.00
emerald shiner	0.04	0.08	0.03	0.03	0.26	0.07	0.06	0.06
golden shiner				0.00				0.00
goldfish				0.25		0.04		0.08
grass carp	2.02	0.56	0.28	1.42				0.67
red shiner		0.01	0.01	0.00	0.01	0.01		0.01
river shiner			0.00		0.01			0.00
sand shiner		0.00			0.01			0.00
silverband shiner		28.42	22.73	17.42				16.09
silver carp		0.00						0.00
silver chub	0.00		0.00					0.00
spotfin shiner		0.00		0.00	0.20	0.13	0.03	0.03
spottail shiner			0.01	0.04	0.02	0.02	0.00	0.02
Catostomidae								
bigmouth buffalo		1.89	2.49	18.19				6.24
black buffalo					3.52			0.27
golden redhorse			0.20	0.14		0.23		0.10
highfin carpsucker					0.33			0.02
quillback				0.01	0.55			0.04
river carpsucker		1.95	0.32	2.37	1.03	0.52	0.96	1.38
shorthead redhorse	0.07	1.69	0.21	0.36		0.54		0.57
smallmouth buffalo	5.16	1.31	1.69	17.84	3.51	1.66	0.03	6.45

Table 18. (continued)

Pounds of each fish species collected per hour of electrofishing (CPUEw) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2005. Pounds per hour less than 0.01 but greater than zero are indicated by 0.00.

	Reach and Hours Fished							
					Starved			Overall
	Reach 26	Alton	La Grange	Peoria	Rock	Marseilles	Dresden	CPUE
Species	1.00	5.83	5.58	7.75	2.00	2.42	2.00	26.58
Ictaluridae								
black bullhead				0.02				0.01
channel catfish	2.11	6.12	3.38	9.01	2.30	0.11	3.58	5.21
flathead catfish	0.73	1.46	9.66	2.58	0.11			3.14
tadpole madtom			0.00					0.00
Fundulidae								
blackstripe topminnow						0.00	0.01	0.00
Poeciliidae								
western mosquitofish			0.00				0.00	0.00
Atherinidae								
brook silverside	0.00	0.00						0.00
Moronidae								
white bass	0.07	1.47	0.95	2.82	0.86	0.43		1.45
yellow bass			0.05	0.00				0.01
white perch		0.02	0.03					0.01
Centrarchidae								
black crappie	0.18	0.26	0.21	1.29			0.85	0.55
bluegill	3.04	0.51	0.32	4.33	1.42	1.94	3.65	2.11
bluegill X greensunfish		0.00	0.02	0.19	0.02	0.15	2.31	0.25
green sunfish	1.36	0.03	0.07	1.65	0.39	0.39	1.90	0.76
largemouth bass	2.78	0.36	0.33	3.74	1.16	3.88	9.75	2.52
longear sunfish						0.04		0.00
orangespotted sunfish	0.11	0.03	0.00	0.07			0.02	0.03
pumpkinseed							0.01	0.00
rock bass							0.81	0.06
smallmouth bass				0.42	0.36	0.54	0.10	0.21
warmouth	0.08		0.03					0.01
white crappie		0.01	0.14	0.19		0.01		0.09
Percidae								
logperch				0.00	0.01			0.00
sauger		0.01		0.21				0.06
Sciaenidae								
freshwater drum	6.70	1.23	1.42	5.60	0.41	0.56		2.54
Total pounds per hour	34.64	56.57	56.34	108.44	21.43	24.35	36.50	63.73

Table 19. Species ranked by relative biomass in pounds of fish collected per hour for 2005. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	4 (4.4)	9 (1.6)	7 (4.0)	3 (16.1)	3 (14.7	3 (12.3)
Cyprinidae						
common carp	2 (11.3)	2 (18.8)	4 (12.5)	7 (5.2)	1 (38.1)	2 (17.5)
common carp x goldfish						8 (3.1)
silver carp	1 (50.3)	1 (40.4)	3 (16.1)			
Catostomidae						
bigmouth buffalo	6 (3.3)	5 (4.4)	1 (16.8)	1 (16.4)		
highfin carpsucker				14 (1.5)		
quillback				10 (2.6)		
river carpsucker	5 (3.5)		12 (2.2)	8 (4.8)	8 (2.1)	9 (2.6)
shorthead redhorse	7 (3.0)				7 (2.2)	
smallmouth buffalo	10 (2.3)	6 (3.0)	2 (16.5)	2 (16.4)	5 (6.8)	
Ictaluridae						
channel catfish	3 (10.8)	4 (6.0)	5 (8.3)	4 (10.7)		5 (9.8)
flathead catfish	9 (2.6)	3 (17.2)	11 (2.4)			
Moronidae						
white bass	8 (2.6)	8 (1.7)	10 (2.6)	9 (4.0)	9 (1.8)	
Centrarchidae						
black crappie						10 (2.3)
bluegill			8 (4.0)	5 (6.6)	4 (8.0)	4 (10)
bluegill X green sunfish						6 (6.3)
green sunfish			13 (1.5)	12 (1.8)	10 (1.6)	7 (5.2)
largemouth bass			9 (3.5)	6 (5.4)	2 (15.9)	1 (26.7)
smallmouth bass				13 (1.7)	7 (2.2)	
Sciaenidae						
freshwater drum		7 (2.5)	6 (5.2)	11 (1.9)	6 (2.3)	
Number of species accouting for 95% of total catch	10	9	13	14	11	10

Table 20. Pounds of each fish species collected per hour of electrofishing ($CPUE_W$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2005. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall CPUE
Species	1.00	5.75	5.16	7.88	2.00	2.50	2.00	26.29
Lepisosteidae								
shortnose gar	0.09		1.14					0.22
Clupeidae								
gizzard shad	3.88	1.63	1.49	3.64	1.48	1.05	2.25	2.27
skipjack herring		0.05	0.03	0.05				0.03
threadfin shad				0.00		0.00		0.00
Cyprinidae								
bluntnose minnow		0.00	0.00	0.00	0.07	0.09	0.18	0.03
bullhead minnow	0.02	0.00	0.01	0.02	0.11	0.05		0.03
central stoneroller				0.00		0.01		0.00
common carp	5.87	5.42	14.63	20.65		2.26	18.88	12.13
common shiner						0.00	0.00	0.00
emerald shiner	0.04	0.11	0.05	0.06	0.39	0.25	0.09	0.11
golden shiner				0.00				0.00
goldfish			0.06	0.04			0.53	0.07
grass carp			1.59	1.67	11.41			1.68
red shiner		0.00	0.00					0.00
river shiner	0.18	0.00	0.00					0.00
sand shiner		0.00		0.00				0.00
silverband shiner				0.00				0.00
silver carp		6.97	65.29	7.59				16.63
silver chub				0.00				0.00
spotfin shiner		0.00		0.00	0.04	0.09	0.01	0.01
spottail shiner	0.02		0.00	0.02		0.01	0.01	0.01
Catostomidae								
bigmouth buffalo	2.12	4.87	1.24	24.59				8.76
black buffalo				0.68				0.20
golden redhorse				0.7			0.30	0.23
highfin carpsucker		0.04		0				0.01
quillback		0.03	0.01	0.07				0.03
river carpsucker		1.00	0.33	4.96	1.27	0.58		1.93
shorthead redhorse		0.10	0.25	0.27				0.16
silver redhorse		0.03						0.01
smallmouth buffalo		0.84	5.76	17.11	3.76	0.79	2.46	7.00
Ictaluridae								
brown bullhead				0.07				0.02
channel catfish	12.93	7.52	4.82	9.51	6.00	1.39	10.53	7.33
flathead catfish	0.01		2.96		2.48			0.77
yellow bullhead				0.19				0.06

Table 20. (continued)

Pounds of each fish species collected per hour of electrofishing (CPUEw) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2006. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
					Starved			Overall
	Reach 26	Alton	La Grange	Peoria	Rock	Marseilles	Dresden	CPUE
Species	1.00	5.75	5.16	7.88	2.00	2.50	2.00	26.29
Fundulidae								
banded killifish					0.00			0.00
blackstripe topminnow						0.00	0.00	0.00
Poeciliidae								
western mosquitofish		0.00		0.00			0.00	0.00
Gobiidae								
round goby					0.00			0.00
Moronidae								
white bass	0.43	1.44	1.21	1.32	0.46	0.27		1.02
yellow bass			0.01					0.00
yellow bass x white perch		0.01						0.00
white perch			0.02					0.00
Centrarchidae								
black crappie	0.74	0.27	0.16	0.31	0.41	0.62	0.56	0.35
bluegill	5.34	0.52	0.62	3.39	1.71	1.54	3.47	2.00
bluegill X greensunfish		0.02		0.03	0.06	0.08	1.01	0.10
green sunfish	1.51	0.03	0.02	1.83	0.31	0.28	1.59	0.79
largemouth bass	8.54	0.81	0.05	5.03	1.24	1.96	3.10	2.54
longear sunfish				0.00		0.07		0.01
orangespotted sunfish	0.48	0.02	0.05	0.13	0.00	0.01	0.00	0.07
redear sunfish	0.16						0.07	0.01
rock bass							0.08	0.01
smallmouth bass				0.14	0.65	0.02	0.15	0.11
warmouth	0.27			0.03				0.01
white crappie				0.03				0.03
Esocidae								
grass pickerel						0.01		0.00
Percidae								
johnny darter			0.00					0.00
logperch				0.00				0.00
mud darter				0.00				0.00
sauger			0.01	0.04				0.01
slenderhead darter				0.00				0.00
walleye				0.01				0.00
Sciaenidae								
freshwater drum	3.12	0.80	1.67	2.73	0.60	0.33	1.15	1.61
Total pounds per hour	45.73	32.52	103.50	106.95	32.47	11.78	46.53	68.39

Table 21. Fish species ranked by relative biomass in pounds of fish collected per hour for 2006. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Clupeidae						
gizzard shad	5 (5.0)	8 (1.4)	8 (3.4)	6 (4.6)	5 (8.9)	6 (4.8)
Cyprinidae						
common carp	3 (16.7)	2 (14.1)	2 (19.3)		1 (19.2)	1 (40.6)
grass carp		7 (1.5)		1 (35.1)		
silver carp	2 (21.4)	1 (63.1)	5 (7.1)			
Catostomidae						
bigmouth buffalo	4 (15.0)		1 (23.0)			
highfin carpsucker						
quillback						
river carpsucker	7 (3.1)		7 (4.6)	7 (3.9)	8 (4.9)	
shorthead redhorse						
smallmouth buffalo	8 (2.6)	3 (5.6)	3 (16.0)	4 (7.6)	6 (6.7)	5 (5.3)
Ictaluridae						
channel catfish	1 (23.1)	4 (4.7)	4 (8.9)	2 (18.5)	4 (11.8)	2 (22.6)
flathead catfish		5 (2.9)		3 (11.6)		
Moronidae						
white bass	6 (4.4)			11 (1.4)	11 (2.3)	
Centrarchidae						
black crappie					7 (5.3)	
bluegill			9 (3.2)	5 (5.3)	3 (13.1)	3 (7.5)
bluegill X green sunfish						9 (2.2)
green sunfish			11 (1.7)		10 (2.4)	7 (3.4)
largemouth bass	9 (2.5)		6 (4.7)	8 (3.8)	2 (16.6)	4 (6.7)
smallmouth bass				9 (2.0)		
Sciaenidae						
freshwater drum	10 (2.5)	6 (1.6)	10 (2.6)	10 (1.8)	9 (2.8)	8 (2.5)
Number of species accouting for 95% of total catch	10	8	11	11	11	9

Table 22. Pounds of each fish species collected per hour of electrofishing ($CPUE_W$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2007. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall CPUE
Species	1.00	5.42	5.50	7.92	2.00	2.50	2.00	26.34
Amiidae								
bowfin		0.78						0.16
Catastomidae								
bigmouth buffalo		3.34	1.89	25.86				8.85
black buffalo		0.73	2.05		1.14			0.66
golden redhorse		0.19		0.57	0.47	0.34	0.83	0.34
highfin carpsucker					0.37			0.03
northern hogsucker				0.58				0.18
quillback						0.44		0.04
river carpsucker	0.20	0.08	0.22	1.83	0.45	1.65		0.81
shorthead redhorse		0.06	0.41	0.01	0.05	0.26	0.02	0.13
silver redhorse							0.20	0.02
smallmouth buffalo	0.48		5.81	31.57	2.97	2.94	1.16	11.31
Centrarchidae								
black crappie	2.04	1.76	0.20	0.60	0.24	0.45	0.01	0.72
bluegill	4.00	0.36	0.13	2.97	0.27	1.02	5.34	1.67
bluegill x green sunfish		0.05	0.00	0.05	0.04		2.46	0.22
green sunfish	0.39	0.01	0.03	1.25	0.05	0.14	1.73	0.55
largemouth bass	1.24	0.49	0.03	3.81	3.40	2.79	22.57	3.54
longear sunfish					0.16			0.01
orange spotted sunfish	0.07	0.02	0.08	0.22		0.02	0.01	0.09
pumpkinseed				0.05	0.02	0.07	0.07	0.03
redear sunfish				0.00				0.00
rock bass				0.07	0.01	0.22	1.08	0.12
smallmouth bass	0.73	0.18		0.07	0.61	0.27	1.34	0.26
warmouth	0.06			0.01				0.01
white crappie			0.00	0.12				0.04
Clupeidae								
gizzard shad	7.15	0.43	1.33	2.57	0.12	1.04	3.22	1.76
skipjack herring			0.02	0.06				0.02
threadfin shad			0.01					0.00
Cyprinidae								
bighead carp					25.35			1.93
bluntnose minnow			0.00		0.18	0.11	0.15	0.04
bullhead minnow	0.02	0.02	0.01	0.07	0.04	0.01		0.03
central stoneroller						0.01		0.00
common carp		2.62	18.98	45.27	10.05	4.95	32.10	21.78
common carp x goldfish		0.21						0.04
emerald shiner	0.03	0.08	0.05	0.07	0.31	0.28	0.01	0.10
golden shiner				0.01			0.06	0.01
goldfish				0.08		0.18	0.88	0.11
grass carp			0.00	3.96				1.19
red shiner			0.01	0.00				0.00
river shiner		0.00	0.00					0.00
silver carp	5.41	15.17	32.77	46.30				24.08
silver chub		0.00	0.01	0.00	0.00			0.00
silverband shiner		0.01	0.00				0.01	0.00
southern redbelly dace				0.00				0.00
spotfin shiner	0.00	0.00		0.01	0.14	0.12		0.02
spottail shiner		0.00		0.02	0.02	0.01	0.00	0.01

Table 22. (continued)

Pounds of each fish species collected per hour of electrofishing (CPUEw) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2007. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
					Starved			Overall
	Reach 26	Alton	La Grange	Peoria	Rock	Marseilles	Dresden	CPUE
Species	1.00	5.42	5.50	7.92	2.00	2.50	2.00	26.34
Fundulidae								
blackstripe topminnow					0.00	0.00		0.00
Gobiidae								
round goby				0.00	0.00	0.01		0.00
Hiodontidae								
goldeye		0.08						0.02
Ictaluridae								
brown bullhead				0.18				0.05
channel catfish	4.88	5.63	14.84	13.72	11.85	11.99	17.82	11.96
flathead catfish	0.71	0.53	12.05	7.23				4.82
tadpole madtom							0.00	0.00
yellow bullhead				0.04			0.39	0.04
Lepisosteidae								
shortnose gar		0.74						0.15
Moronidae								
white bass		1.44	3.12	2.63	0.10	0.69		1.81
white perch			0.04					0.01
yellow bass			0.17		0.04			0.04
yellow bass x white perch			0.01					0.00
Percidae								
logperch				0.01				0.00
mud darter		0.00						0.00
sauger		0.02	0.04					0.01
Poeciliidae								
western mosquitofish			0.01	0.01				0.00
Sciaenidae								
freshwater drum	0.09	2.09	2.48	4.60	0.33	2.60	3.00	2.83
Total pounds per hour	27.49	37.09	96.80	196.38	58.78	32.65	94.44	102.67

Table 23. Fish species ranked by relative biomass in pounds of fish collected per hour for 2007. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Amiidae						
bowfin	8 (2.1)					
Catostomidae						
bigmouth buffalo	3 (9.0)		4 (13.2)			
black buffalo	10 (2.0)	8 (2.1)		6 (1.9)		
golden redhorse				8 (0.8)	12 (1.1)	
quillback					11 (1.4)	
river carpsucker					6 (5.1)	
smallmouth buffalo		5 (6.0)	3 (16.1)	5 (5.1)	3 (9.0)	
Centrarchidae						
black crappie	4 (4.7)				10 (1.4)	
bluegill			10 (1.5)		8 (3.1)	4 (5.6)
bluegill x green sunfish						7 (2.6)
green sunfish						8 (1.8)
largemouth bass	12 (1.3)		9 (1.9)	4 (5.8)	4 (8.6)	2 (23.9)
smallmouth bass				7 (1.0)		9 (1.4)
Clupeidae						
gizzard shad					7 (3.2)	5 (3.4)
Cyprinidae						
bighead carp				1 (43.1)		
common carp	4 (7.1)	2 (19.6)	2 (23.1)	3 (17.1)	2 (15.2)	1 (34.0)
grass carp			8 (2.0)			
silver carp	1 (40.9)	1 (33.9)	1 (23.6)			
Ictaluridae						
channel catfish	2 (15.2)	3 (15.3)	5 (7.0)	2 (20.2)	1 (36.7)	3 (18.9)
flathead catfish	11 (1.4)	4 (12.4)	6 (3.7)			
Lepisosteidae						
shortnose gar	9 (2.0)					
Moronidae						
white bass	7 (3.9)	6 (3.2)			9 (2.1)	
Sciaenidae						
freshwater drum	5 (5.6)	7 (2.6)	7 (2.3)		5 (8.0)	6 (3.2)
Number of species accouting for 95% of total catch	12	8	10	8	12	9

Table 24. Pounds of each fish species collected per hour of electrofishing ($CPUE_W$) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2008. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
	Reach 26	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden	Overall CPUE
Species	1.00	3.68	5.58	8.00	2.00	2.42	2.00	24.68
Amiidae								
bowfin		3.32	0.11					0.52
Atherinidae								
brook silverside						0.00		0.00
Catastomidae								
bigmouth buffalo	0.17	1.18	1.82	19.58				6.94
black buffalo			0.25	0.31				0.16
golden redhorse				0.26	0.16	0.19		0.12
highfin carpsucker				0.05				0.02
river carpsucker		0.69	2.06	2.16		0.99		1.37
shorthead redhorse		0.49	0.76	0.36	0.02	0.01		0.36
smallmouth buffalo	1.94	0.18	4.04	15.12	3.87	4.32	0.28	6.68
Centrarchidae								
black crappie	0.02	0.31	0.92	1.76	1.07	0.52	0.22	0.98
bluegill	1.15	0.85	2.10	6.31	0.53	1.18	8.31	3.53
bluegill x green sunfish			0.01	0.17	0.04			0.15
green sunfish	0.15		0.37	1.13	0.14	0.06	1.24	0.57
largemouth bass	0.69	1.53	5.66	6.17	1.83	6.64	22.44	6.15
longear sunfish						0.03	0.02	0.00
orange spotted sunfish	0.05	0.00	0.23	0.18		0.04	0.03	0.12
pumpkinseed			0.02	0.00	0.04	0.16	0.03	0.03
redear sunfish		0.01				0.05		0.01
rock bass							1.20	0.10
smallmouth bass	1.01			0.62	0.98	0.08	2.21	0.51
warmouth		0.02	0.09	0.00				0.02
white crappie			0.53	0.10				0.15
Clupeidae								
gizzard shad	1.18	0.36	0.36	1.82	1.57	1.61	1.24	1.16
skipjack herring		0.01	0.01	0.02	0.03	0.05		0.02
threadfin shad	0.01	0.01	0.06	0.01	0.01		0.00	0.02
Cyprinidae								
bighead carp	2.04							0.08
bluntnose minnow					0.17	0.20	0.20	0.05
bullhead minnow	0.00	0.01	0.00	0.01	0.09	0.04	0.01	0.02
central stoneroller				0.00	0.03	0.01		0.00
common carp	1.15	28.76	23.02	40.90	12.73	16.60	20.24	27.10
emerald shiner		0.00	0.01	0.08	0.71	0.06	0.03	0.09
golden shiner				0.00				0.00
goldfish			0.08	0.05		0.03	1.02	0.12
grass carp			2.38	3.56	7.59			2.31
longnose dace						0.01		0.00
red shiner			0.00	0.01				0.00
river shiner					0.01			0.00
silver carp	4.11	24.65	15.27	27.43				16.19
silver chub			0.00					0.00
silverband shiner			0.00					0.00
spotfin shiner				0.01	0.17	0.20	0.03	0.04
spottail shiner				0.04	0.03	0.01	0.01	0.02

Table 24. (continued)

Pounds of each fish species collected per hour of electrofishing (CPUEw) on Reach 26 of the Mississippi River (Brickhouse Slough) and on six reaches of the Illinois Waterway in 2008. Pounds per hour less than 0.01, but greater than zero, are indicated by 0.00.

	Reach and Hours Fished							
					Starved			Overall
	Reach 26	Alton	La Grange	Peoria	Rock	Marseilles	Dresden	CPUE
Species	1.00	3.68	5.58	8.00	2.00	2.42	2.00	24.68
Esocidae								
grass pickerel						0.05		0.00
Fundulidae								
blackstripe topminnow				0.00		0.00	0.00	0.00
Gobiidae								
round goby					0.01	0.01		0.00
Hiodontidae								
mooneye			0.01					0.00
Ictaluridae								
black bullhead			0.01	0.16				0.05
brown bullhead				0.06				0.02
channel catfish	3.82	23.48	16.56	4.66	5.09	4.13	17.49	11.15
flathead catfish	0.83	2.97	3.41	0.26	1.20			1.43
tadpole madtom			0.00					0.00
yellow bullhead				0.23				0.21
Lepisosteidae								
longnose gar			0.01					0.00
spotted gar	0.12	0.04	0.02					0.01
Moronidae								
white bass	0.05	1.59	3.35	2.01		0.03		1.65
yellow bass			0.25	0.00				0.06
Percidae								
blackside darter					0.00	0.00	0.00	0.00
logperch				0.01		0.00	0.00	0.00
mud darter						0.00		0.00
sauger		0.10	0.19	0.09				0.09
slenderhead darter						0.00		0.00
Poeciliidae								
western mosquitofish				0.00				0.00
Sciaenidae								
freshwater drum	2.42	4.34	7.75	4.68	0.55	1.02	1.61	4.29
Total pounds per hour	20.91	94.98	91.76	140.37	38.63	38.30	80.70	94.68

Table 25. Fish species ranked by relative biomass in pounds of fish collected per hour for 2008. Species were added to the list in descending order of abundance until 95% of the total catch for that reach was obtained. Percentages are in parentheses.

	Rankings by Reach					
Species	Alton	La Grange	Peoria	Starved Rock	Marseilles	Dresden
Amiidae						
bowfin	5 (3.5)					
Catostomidae						
bigmouth buffalo		12 (2.0)	3 (13.9)			
river carpsucker		11 (2.2)	10 (1.5)		8 (2.6)	
smallmouth buffalo		6 (4.4)	4 (10.8)	4 (10.0)	3 (11.3)	
Centrarchidae						
black crappie				8 (2.8)		
bluegill		10 (2.3)	5 (4.5)		6 (3.1)	4 (10.3)
green sunfish						8 (1.5)
largemouth bass	8 (1.6)	5 (6.2)	6 (4.4)	5 (4.7)	2 (17.3)	1 (27.8)
smallmouth bass				9 (2.5)		5 (2.7)
Clupeidae						
gizzard shad			12 (1.3)	6 (4.1)	5 (4.2)	8 (1.5)
Cyprinidae						
common carp	1 (30.3)	1 (25.1)	1 (29.1)	1 (33.0)	1 (43.3)	2 (25.1)
emerald shiner				10 (1.8)		
grass carp		9 (2.6)	9 (2.5)	2 (19.6)		
silver carp	2 (26.0)	3 (16.6)	2 (19.5)			
Ictaluridae						
channel catfish	3 (24.7)	2 (18.0)	8 (3.3)	3 (13.2)	4 (10.8)	3 (21.7)
flathead catfish	6 (3.1)	7 (3.7)		7 (3.1)		
yellow bullhead						6 (2.1)
Moronidae						
white bass	7 (1.7)	8 (3.6)	11 (1.4)			
Sciaenidae						
freshwater drum	4 (4.6)	4 (8.4)	7 (3.3)		7 (2.7)	7 (2.0)
Number of species accouting for 95% of total catch	8	12	12	10	8	9

2007; and all reaches but Dresden in 2008 (Tables 17, 19, 21, 23, and 25). Silver carp ranked first in pounds of fish collected per hour in Alton and La Grange reaches in 2005; La Grange Reach in 2006; and Alton, La Grange, and Peoria reaches in 2007 (Tables 19, 21, and 23). Bigmouth buffalo ranked first in relative biomass in Peoria and Starved Rock reaches in 2005 and Peoria Reach in 2006 (Tables 19 and 21). Channel catfish ranked first in pounds of fish collected per hour in Alton Reach in 2006 and Marseilles Reach in 2007, while largemouth bass ranked first in pounds of fish collected per hour in Dresden Reach in 2005 and 2008 (Tables 19, 21, 23 and 25).

E. Stock Density Indices of Common Sportfish

Proportional stock density (PSD) and relative stock density (RSD) indices are represented in Table 26 for the entire Illinois Waterway and Table 27 for the Upper, Middle and Lower Illinois Waterway segments separately. The PSD and RSD values were calculated for common sport fish species collected throughout the Illinois Waterway. Values were calculated for nine species of sport fish collected from 2004-2008 including black crappie, bluegill, channel catfish, flathead catfish, largemouth bass, rock bass, smallmouth bass, white bass, and white crappie. Bluegill had the highest total catch at stock or greater length with 2,606 fish collected from the Illinois Waterway as a whole (Table 26). Bluegill also had the greatest numbers at stock length for all three waterway segments (Lower Waterway, 111; Middle Waterway, 1,732; Upper Waterway, 763; Table 27). Stock length bluegill numbers for the entire

Table 26. Proportional Stock Density and Relative Stock Density of common sportfish of the Illinois Waterway, 2004-2008. Values in parentheses represent minimum length requirement of fish in inches per category (Anderson and Neuman, 1996).

			Proportional Stock Density		Relative Stock Density		
	Total	Number at	PSD	RSD	RSD	RSD	
Species	Number	Stock Length	Quality	Preferred	Memorable	Trophy	
bluegill	5043	(3) 2606	(6) 17	(8) <1	(10) 0	(12) 0	
largemouth bass	940	(11) 425	(16) 37	(24) 7	(28) 0	(36) 0	
channel catfish	870	(8) 634	(12) 46	(15) 2	(20) <1	(25) 0	
white bass	668	(6) 380	(9) 54	(12) 25	(15) 2	(18) 0	
black crappie	252	(5) 199	(8) 62	(10) 17	(12) 2	(15) 0	
flathead catfish	150	(14) 72	(20) 36	(28) 15	(34) 8	(40) 0	
smallmouth bass	122	(5) 55	(8) 16	(10) 4	(12) 2	(15) 0	
rock bass	56	(4) 52	(7) 12	(9) 2	(11) 0	(13) 0	

Table 27. Proportional Stock Density and Relative Stock Density of most common sportfish of the three segments (Upper, Middle, and Lower) of the Illinois Waterway, 2004-2008. Values in parentheses represent minimum length requirement of fish in inches per category (Anderson and Neuman, 1996).

Upper Waterway

			Proportional Stock Density		Relative Stock Density	
	Total	Number at	PSD	RSD	RSD	RSD
Species	Number	Stock Length	Quality	Preferred	Memorable	Trophy
bluegill	2031	(3) 763	(6) 14	(8) <1	(10) 0	(12) 0
largemouth bass	464	(8) 230	(12) 31	(15) 3	(20) 0	(25) 0
channel catfish	117	(11) 107	(16) 55	(24) 3	(28) 1	(36) 0
smallmouth bass	82	(7) 37	(11) 11	(14) 0	(17) 0	(20) 0
rock bass	55	(4) 51	(7) 10	(9) 0	(11) 0	(13) 0
black crappie	33	(5) 32	(8) 81	(10) 41	(12) 6	(15) 0

Middle Waterway

			Proportional Stock Density		Relative Stock Density	
	Total	Number at	PSD	RSD	RSD	RSD
Species	Number	Stock Length	Quality	Preferred	Memorable	Trophy
bluegill	2665	(3) 1732	(6) 19	(8) 0	(10) 0	(12) 0
channel catfish	510	(11) 373	(16) 47	(24) 2	(28) 0	(36) 0
white bass	475	(6) 279	(9) 56	(12) 25	(15) 3	(18) 0
largemouth bass	422	(8) 172	(12) 45	(15) 11	(20) 0	(25) 0
black crappie	186	(5) 138	(8) 52	(10) 8	(12) <1	(15) 0
flathead catfish	104	(14) 51	(20) 43	(28) 22	(34) 12	(40) 0
smallmouth bass	38	(7) 16	(11) 31	(14) 12	(17) 6	(20) 0
white crappie	32	(5) 23	(8) 78	(10) 17	(12) 4	(15) 0

Lower Waterway

			Proportional Stock Density		Relative Stock Density	
	Total	Number at	PSD	RSD	RSD	RSD
Species	Number	Stock Length	Quality	Preferred	Memorable	Trophy
bluegill	365	(3) 111	(6) 13	(8) 0	(10) 0	(12) 0
channel catfish	243	(11) 154	(16) 37	(24) 1	(28) <1	(36) 0
white bass	179	(6) 92	(9) 45	(12) 21	(15) 0	(18) 0
largemouth bass	54	(8) 23	(12) 35	(15) 9	(20) 0	(25) 0
flathead catfish	43	(14) 19	(20) 11	(28) 0	(34) 0	(40) 0
black crappie	33	(5) 29	(8) 86	(10) 34	(12) 0	(15) 0

waterway were more than double that found in the previous years where a total of 1,283 were recorded for 1999-2003 (McClelland and Pegg 2004). The PSD values observed throughout the entire waterway for black crappie, bluegill, and flathead catfish were all greater than those values recorded in 1999-2003 (McClelland and Pegg 2004). Black crappie had the highest PSD value of any sport fish species for the entire Illinois Waterway during 2004-2008 (62; Table 26) and also had the highest PSD values for the Lower and Upper Waterway (86 and 81, respectively; Table 27). White crappie had the highest PSD in the Middle Waterway (43; Table 27). The RSD values observed for the preferred length category throughout the entire waterway were also higher for black crappie, bluegill, and flathead catfish than those recorded in 1999-2003 (McClelland and Pegg 2004). The RSD values for the memorable length category were higher for black crappie, channel catfish, flathead catfish, and smallmouth bass than the values observed in 1999-2003 (McClelland and Pegg 2004). Relative stock density values for the preferred length category for the entire Illinois Waterway were highest for white bass (25; Table 26). White bass also had the highest RSD values in the preferred length category for the Middle Waterway (25; Table 27), while black crappie had the highest RSD (preferred) in the Lower and Upper Waterway (34 and 41, respectively; Table 27). The highest RSD memorable length category values for the Lower Waterway were channel catfish (<1), for the Middle Waterway were flathead catfish (12), and for the Upper Waterway were black crappie (6; Table 27). As in previous years, no fish were collected in the RSD trophy length category.

F. Details of 2009 Experimental Sampling for F-101-R Amendment: The Long-Term Illinois and Mississippi Rivers Fish Population Monitoring Program.

Introduction

The 2009 amendment to F-101-R called for the expansion of the Long-Term Illinois River Fish Population Program by conducting additional monitoring on the Illinois River and Illinois portions of the Mississippi River. The primary purpose of the amendment to the program was to include random-site, pulsed-DC electrofishing runs in multiple reaches of the Illinois River and two pools of the Mississippi River within the Illinois border, and to conduct main channel fisheries collections with additional sampling gears in the Mississippi River. The expanded version of this program aims to provide additional procedures that will comparable to that of the Long-term Resource Monitoring Program (LTRMP) on the Upper Mississippi River System (UMRS) where fish communities are studied in six regional trend areas (Pool 4, Pool 8, Pool 13, Pool 26, Open River Reach, and La Grange Reach of the Illinois River). The primary goal of our increased monitoring is to further bolster this survey in an effort to provide managers with fisheries information in order to make sound management decisions. The secondary purpose of this amendment is to specifically target main channel habitats in order to provide critical, yet relatively unknown, information about these fish communities.

Study Area and Methods

Sampling for the Long-Term Illinois and Mississippi River Fish Population Monitoring Program was conducted in seven study areas: five reaches of the Illinois Waterway and two pools of the Mississippi River (Figure 7). Illinois Waterway reaches sampled included four Illinois River reaches consisting of Alton Reach (RM 0-80), Peoria Reach (RM 158-231), Starved Rock Reach (RM 231-247), and Marseilles Reach (RM 247-271.5) with Dresden Reach (RM 271.5-286) on the Des Plaines River portion of the waterway. Mississippi River pools sampled included Pool 19 (RM 364.5-410.5) and a 35 mile segment of the Open River encompassing the Chain of Rocks area from river mile 165.5 to Mel Price Lock and Dam at river mile 200.5.

Electrofishing collections were conducted according to established LTRMP protocols as described by Gutreuter et al. (1995). Boat-mounted pulsed-DC electrofishing was used to capture fish. A three man crew consisting of a pilot and two dippers performed 15 minute electrofishing runs at a collection site. Power was supplied by a 5,000 W generator with voltage and amperage adjusted to 3,000 W to achieve LTRMP standardized power goals (Gutreuter et al. 1995). Stunned fish were captured with a dip net of 1/8" (3mm) mesh and placed in an oxygenated livewell until sampling was completed. Fish were then identified to species, measured for total length and weight, and returned to the water.

Hoop net collections were conducted over a 48 hour period similar to LTRMP standardized hoop netting protocol. Two different hoop net designs were used,

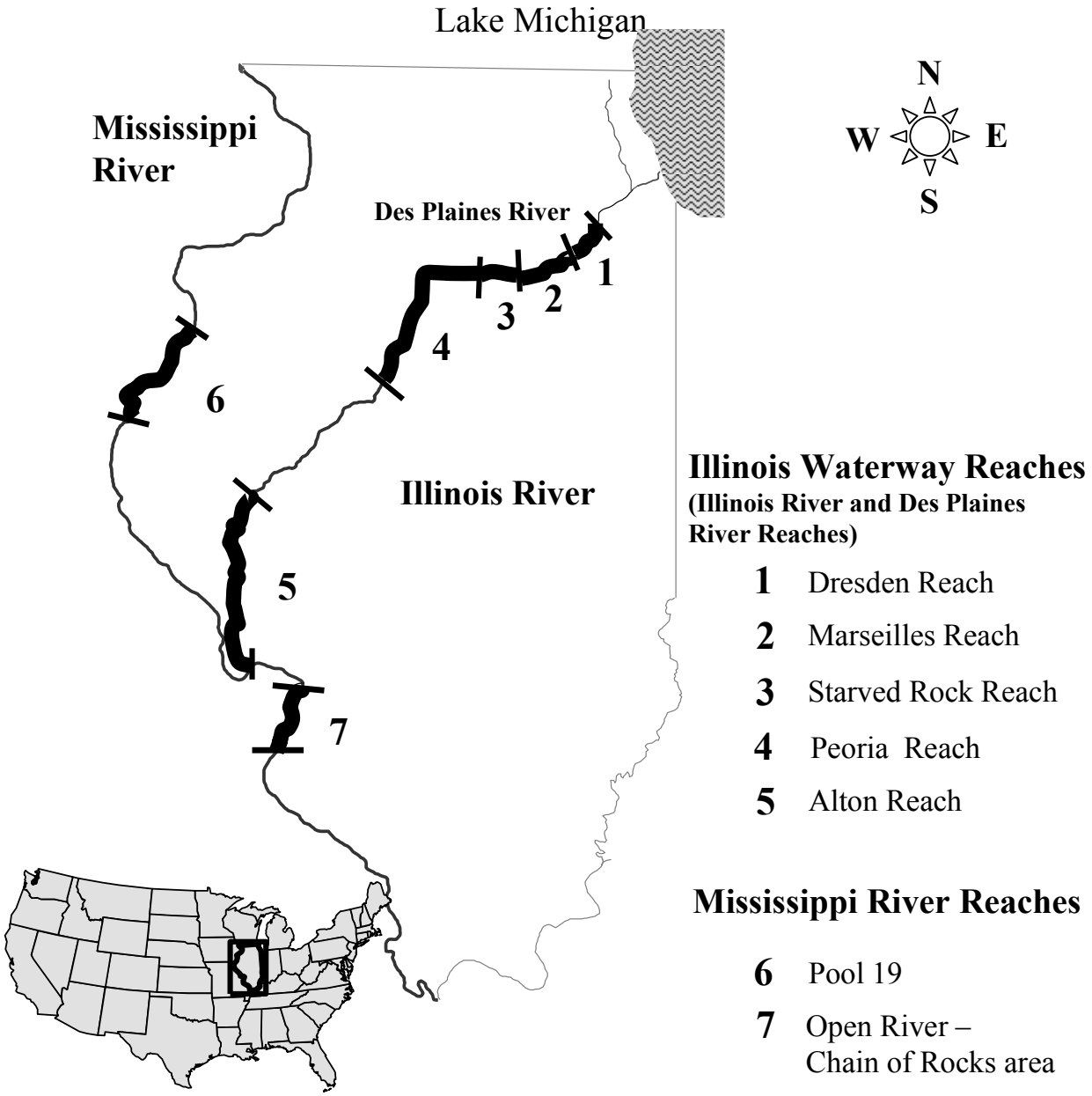

Figure 7. Map of the Illinois River waterway and Mississippi River illustrating areas sampled through the Long-Term Illinois and Mississippi River Fish Population Monitoring Program to monitor fish in 2009.

standard hoop nets with a mesh size of two inches and benthic hoop nets hoops with outside mesh of one inch with the inside lined with three mm “Ace” type mesh similar to LTRMP mini-fyke nets. Each net was approximately 12ft long consisting of seven hoops. Hoop nets were fished below the Chain of Rocks area of the Open River on a known gravel bar at approximately river mile 190.0. Standard hoop nets were set in two transects of three nets that ran perpendicular to the shoreline with each transect separated longitudinally by approximately 300 meters. A single benthic hoop net was set approximately 100 meters downstream of each standard hoop net transect.

Gill net collections were conducted between two and three hours for each set. Gill nets were all 150 feet long with two net designs; small mesh gill nets made of #10 monofilament with two inch square mesh, 10 feet deep and large mesh gill nets made of #8 monofilament with five inch square mesh, 18 feet deep. Gill nets were fished in a side channel below the Chain of Rocks area off of wing dams. Small mesh gill nets were anchored in the middle of the wing dam, set parallel with the shore, and anchored at the end. Large mesh gill nets were fished off the tip of the wing dam, anchored on top of the wing dam, drifted straight back, and anchored parallel with the shore. Hoop netting and gill netting design and location recommendations were given by Rob Maher, IDNR.

Physical measurements for ancillary water quality parameters that included water temperature, dissolved oxygen, Secchi disk transparency, conductivity, surface velocity, water depth, and river stage were recorded prior to each electrofishing run and net set. River stage information was recorded from U.S. Army Corps of Engineers river gage readings at a single location from each sampling reach for standardization. The

following river gages used for each reach were: Alton Reach – Florence gage; Peoria Reach – Henry gage; Starved Rock Reach – Ottawa gage; Marseilles Reach – Morris gage; Dresden Reach – Brandon Road Lock & Dam gage; Pool 19 – Ft. Madison, IA gage; Open River – St. Louis, MO gage.

A total of 29 random electrofishing samples, eight hoop net sets, and four gill net sets were conducted over all study areas. Electrofishing collection sites were randomized along main channel border habitat for each study area with the number of random sites per reach standardized by reach length as follows: Dresden Reach, 3 sites; Marseilles Reach, 3 sites; Starved Rock Reach, 3 sites; Peoria Reach, 6 sites; Alton Reach, 6 sites; Pool 19, 4 sites; Open River, 4 sites. The eight hoop nets and four gill nets were fished in main channel habitat in the Open River Chain of Rocks area.

Data Analysis

At each site, number of individual fish and total weight (pounds) were tallied for each species. Fish catch rates were calculated as the number of individuals collected per hour of electrofishing ($CPUE_N$) and as weight in pounds collected per hour of electrofishing ($CPUE_W$). Catch data, in numbers of individuals and pounds collected per sample and hour, were summarized and reported by collection site. Data from sites were also grouped into reaches defined by navigation dams (Figure 7) as follows: Alton Reach, (river mile [RM] 0-80), Peoria Reach (RM 158-231), Starved Rock Reach (RM

231-247), and Marseilles Reach (RM 247-271.5) of the Illinois River – Illinois Waterway; Dresden Reach (RM 271.5-286) on the Des Plaines River – Illinois Waterway; and Open River - Chain of Rocks area (RM 165.5-200.5) and Pool 19 (RM 364.5-410.5) on the Mississippi River.

Results

Information for water quality measurements, total catch numbers at electrofishing and net sites, and catch rates in terms of $CPUE_N$ and $CPUE_W$ for electrofishing collections are provided in Tables 28-35. In 2009 amendment sampling, we collected a total of 1,240 fish representing 51 species plus one hybrid from 12 families at 26 random electrofishing sites, four gill net sets at one fixed location, and eight hoop net sets at one fixed location on the Illinois and Mississippi Rivers.

Electrofishing Results

Electrofishing was conducted from 14 May to 29 June 2009 between 8:15 a.m. and 12:39 p.m. central standard time. Physical measurements for ancillary water quality parameters during electrofishing were as follows: water temperature, 60.3-84.4 F; dissolved oxygen concentration, 5.2-14.4 ppm; Secchi disk transparency, 6-44 cm; conductivity, 287-802 µhos/cm; surface velocity, 0.01-0.66 ft/s; water depth, 0.8-8.0 ft (Table 28). All physical values were within the ranges expected based upon previous sampling (Lerczak et al. 1994; Koel and Sparks 1999; McClelland and Pegg 2004).

Table 28. Station information and characteristics during pulsed-DC electrofishing amendment experimental sampling in 2009. All stations are on the Illinois and Mississippi Rivers and are listed in downstream to upstream order by river.

Site Code	Site Mile[a]	Date	Start Time (CST)	Effort (h)	Water Temp (F)	DO (ppm)	Secchi (cm)	Cond. (umhos)	Volts	Vel. (ft/s)	Depth[b] (ft)	Stage[c] (ft)
Illinois River												
Alton Reach												
ARS.4E	62.8	22-Jun	8:55	0.25	77.9	6.1	17	505	140	0.15	6.0	31.6
ARS.3E	62.2	22-Jun	9:40	0.25	79.0	6.0	8	511	140	0.10	6.0	31.6
ARS.2E	55.2	22-Jun	10:40	0.25	78.4	5.9	10	499	140	0.28	5.0	31.6
ARS.5E	5.2	29-Jun	9:50	0.25	83.5	5.6	10	632	215	0.36	0.8	31.2
ARS.0E	8.9	29-Jun	10:40	0.25	83.7	5.7	10	627	256	0.82	1.3	31.2
ARS.1E	15.3	29-Jun	12:20	0.25	84.4	5.2	12	621	256	0.27	1.4	31.2
Peoria Reach												
PRS.1E	220.8	14-May	9:52	0.25	61.9	14.4		487	160	0.31	7.5	23.1
PRS.2E	225.1	14-May	10:48	0.25	62.4	13.5		558	165	0.34	5.5	23.1
PRS.5E	226.8	14-May	11:46	0.25	60.3	13.9		287	145	0.66	6.0	23.1
PRS.0E	228.9	14-May	12:39	0.25	64.9	12.3		592	160	0.21	5.5	23.1
PRS.4E	162.0	17-Jun	8:50	0.25	73.4	10.0	16	651	180	0.30	6.0	18.8
PRS.3E	203.0	17-Jun	11:45	0.25	72.7	7.9	22	649	180	0.23	5.5	18.8
Starved Rock Reach												
SRS.2E	235.0	18-May	11:37	0.25	60.4	10.8	7	439	165	0.35	5.5	463.7
SRS.5E	238.7	18-May	12:39	0.25	61.3	8.6	11	434	165	0.35	6.5	463.7
Marseilles Reach												
MRS.1E	247.3	19-May	11:37	0.25	63.3	8.7	6	456	165	0.49	5.1	13.2
MRS.4E	247.5	19-May	12:29	0.25	63.7	8.8	6	443	165	0.26	5.3	13.2
Dresden Reach												
DRS.0E	272.2	20-May	10:20	0.25	65.7	8.5	12	628	175	0.19	8.0	504.9
DRS.3E	274.0	20-May	11:31	0.25	70.0	9.6	44	802	180	0.01	5.0	504.9
Mississippi River												
Open River-Chain of Rocks area												
ORRS.5E	174.0	4-Jun	11:50	0.25	72.3	6.8	11	456	200	0.44	3.0	20.5
ORRS.2E	176.4	4-Jun	10:00	0.25	71.2	6.6	22	493	200	0.18	6.0	20.5
ORRS.3E	180.0	4-Jun	8:50	0.25	70.2	7.6	23	555	210	0.21	0.9	20.5
ORRS.0E	199.0	5-Jun	10:00	0.25	70.3	7.8	15	466	194	0.40	1.0	20.2
Pool 19												
19RS.2E	365.1	21-May	9:10	0.25	65.1	7.7	16	414	165	0.01	2.3	526.8
19RS.3E	365.5	21-May	8:15	0.25	64.6	7.3	13	414	165	0.01	2.5	526.8
19RS.9E	367.5	21-May	10:20	0.25	66.7	7.9	22	383	165	0.04	5.5	526.8
19RS.6E	372.8	21-May	11:20	0.25	65.8	7.8	15	392	165	0.11	5.5	526.8
Minimum					60.3	5.2	6	287	140	0.01	0.8	
Maximum					84.4	14.4	44	802	256	0.66	8.0	
Mean					69.7	8.5	12.6	515	178	0.27	4.6	
Total time electrofished				6.50								

[a]Refers to approximate river mile electrofished at each site in 2009.

[b]Estimated during sampling.

[c]Feet above sea level or river stage (ft) at selected U.S. Army Corps of Engineers river gages for each sampling reach.

Table 29. Station information and characteristics during gill and hoop net amendment experimental sampling in 2009. All stations are on the Open River-Chain of Rocks area of the Mississippi River and are listed by sampling gear.

Site Code	Site Mile[a]	Start Date	End Date	Start Time	End Time	Effort (h)	Water Temp (F)	DO (ppm)	Secchi (cm)	Cond. (umhos)	Vel. (ft/s)	Depth[b] (ft)	Stage[c] (ft)
Mississippi River													
Open River-Chain of Rocks area													
Gear													
Small Mesh Gill Net													
0609.GS1	188.0	23-Jun	23-Jun	8:00	10:35	2.58	79.5	5.4	8	486	0.65	24.09	25.1
0609.GS2	188.0	23-Jun	23-Jun	8:45	11:40	2.92	79.7	5.2	6	498	0.52	13.2	25.1
Large Mesh Gill Net													
0609.GL1	188.0	23-Jun	23-Jun	8:10	10:40	2.50	79.5	5.4	8	486	0.65	22.11	25.1
0609.GL2	188.0	23-Jun	23-Jun	8:35	11:25	2.83	79.7	5.2	6	497	0.50	20.13	25.1
Standard Hoop Net													
0609.HP1	190.0	23-Jun	25-Jun	9:05	9;50	48.83	79.7	5.3	6	497	0.42	10.23	25.1
0609.HP2	190.0	23-Jun	25-Jun	9:20	10:00	48.67	79.7	5.2	6	497	0.66	10.56	25.1
0609.HP3	190.0	23-Jun	25-Jun	9:25	10:20	48.92	79.5	5.4	6	498	1.10	14.19	25.1
0609.HP4	190.0	23-Jun	25-Jun	9:40	10:50	49.17	79.9	5.3	6	497	1.35	14.19	25.1
0609.HP5	190.0	23-Jun	25-Jun	9:50	10:55	49.00	79.9	5.5	6	480	0.87	7.92	25.1
0609.HP6	190.0	23-Jun	25-Jun	9:55	11:10	49.25	79.9	5.4	6	480	0.75	7.92	25.1
Benthic Hoop Net													
0609.HB1	190.0	23-Jun	25-Jun	9:30	10:30	49.00	79.7	5.3	6	497	1.20	13.2	25.1
0609.HB2	190.0	23-Jun	25-Jun	10:00	11:35	49.58	79.7	5.4	6	479	0.79	9.9	25.1
Mean							79.7	5.3	6.3	491.0	0.8	14.0	

[a]Refers to approximate river mile of nets set at each site in 2009.

[b]Estimated during sampling.

[c]Feet above sea level (ft) at the U.S. Army Corps of Engineers St. Louis river gage for the Open River-Chain of Rocks sampling segment.

Table 30. Number of individuals of each fish species collected at random sites, listed by river mile, in the Alton and Peoria reaches of the Illinois River Waterway during amendment exprimental sampling in 2009.

	Alton Reach							Peoria Reach						
River Mile	5.2	8.9	15.3	55.2	62.2	62.8	Total	162.2	202.7	220.8	225.1	226.8	228.9	Total
Amiidae														
bowfin						1	1							
Catastomidae														
bigmouth buffalo													1	1
black buffalo								1				4	1	6
golden redhorse										1			4	5
highfin carpsucker												1		1
quillback											1			1
river carpsucker		5	5	4	1		15	3		1		1	4	9
shorthead redhorse		2	3		3		8	1						1
smallmouth buffalo			1				1	20	9		2	4	4	39
Centrarchidae														
black crappie		2					2							
bluegill	1						1	2	1		1	1	7	12
green sunfish						1	1				2		1	3
largemouth bass		3		1			4	1						1
orange spotted sunfish		1					1							
pumpkinseed											1			1
smallmouth bass											1		3	4
Clupeidae														
gizzard shad	2	3	5	2			12	1				1		2
skipjack herring					1	1	2		1		3			4
Cyprinidae														
common carp	3	4	16	7		1	31	5	2	1	5		1	14
emerald shiner		1					1	1			11		15	27
grass carp	1		1				2	1			1		1	3
red shiner											1			1
silver carp	1	6	2	1			10	10	1	1			6	18
silverband shiner								1						1
spotfin shiner		1					1							
Hiodontidae														
goldeye			2				2							
mooneye						1	1		1					1
Ictaluridae														
channel catfish	1	8	1		8		18	3	1	1	1		1	7
flathead catfish		2	1				3		1					1
Lepisosteidae														
longnose gar												2		2
shortnose gar		3	5		1	1	10	1	1			1		3
Moronidae														
white bass		6	2	2	1	1	12	18	3	1	4	2	4	32
white perch										1				1
yellow bass													1	1
Percidae														
sauger										1	2	1	2	6
Sciaenidae														
freshwater drum	1	9	4	3	2	1	20				19		7	26
Total individuals	10	56	48	20	17	8	159	69	21	8	55	18	63	234
Total species/hybrids	7/0	15/0	13/0	7/0	7/0	8/0	23/0	15/0	10/0	8/0	15/0	10/0	17/0	31/0

Table 31. Number of individuals of each fish species collected at random sites, listed by river mile, in the Starved Rock, Marseilles, and Dresden reaches of the Illinois River Waterway during amendment experimental sampling in 2009.

	Starved Rock Reach			Marseilles Reach			Dresden Reach		
River Mile	235.0	238.7	Total	247.3	247.5	Total	272.2	274.0	Total
Catastomidae									
black buffalo	4		4						
golden redhorse					3	3	10	11	21
highfin carpsucker	2	1	3						
quillback		1	1						
river carpsucker	9	4	13	3	3	6			
shorthead redhorse				3	2	5	5	4	9
silver redhorse							6		6
smallmouth buffalo	10	7	17	6	2	8	2		2
Centrarchidae									
bluegill				2	2	4	6	15	21
green sunfish					2	2	3	2	5
largemouth bass								10	10
pumpkinseed							1		1
rock bass								1	1
smallmouth bass	1		1	5	3	8	9	7	16
Clupeidae									
gizzard shad					1	1	1	7	8
Cyprinidae									
bluntnose minnow				1		1	2	47	49
bullhead minnow				5	7	12	5	20	25
common carp	2		2		2	2	1	3	4
common shiner								1	1
creek chub					1	1			
emerald shiner	1		1	2	1	3			
golden shiner								5	5
grass carp	1	1	2						
red shiner								2	2
river shiner								2	2
spotfin shiner							1	6	7
Gobiidae									
round goby							1		1
Ictaluridae									
channel catfish	1	1	2	2	4	6	1		1
flathead catfish		1	1		1	1			
Lepisosteidae									
shortnose gar		1	1						
Moronidae									
white bass	2	2	4	2	3	5			
Percidae									
sauger		2	2						
walleye		1	1						
Sciaenidae									
freshwater drum	22	1	23	12	12	24		1	1
Total individuals	55	23	78	43	49	92	54	144	198
Total species/hybrids	11/0	12/0	16/0	11/0	16/0	17/0	15/0	17/0	22/0

Table 32. Number of individuals of each fish species collected at random sites, listed by river mile, in the Open River and Pool 19 of the Mississippi River during amendment experimental sampling in 2009.

	Open River					Pool 19				
River Mile	174.0	176.4	180.0	199.0	Total	365.1	365.5	367.5	372.8	Total
Catastomidae										
bigmouth buffalo		1			1					
black buffalo	1				1					
river carpsucker		10	4	5	19					
shorthead redhorse		1			1	1		1		2
smallmouth buffalo						2				2
spotted sucker						1				1
Centrarchidae										
black crappie						1				1
bluegill	2	1	1		4	4	3	7	1	15
green sunfish								1	1	2
largemouth bass						4	4	4	4	16
orange spotted sunfish						1	1			2
smallmouth bass						1		3		4
Clupeidae										
gizzard shad	2	4	18	38	62		1			1
skipjack herring				1	1					
Cyprinidae										
common carp	3	26	11	5	45	5	6	7	5	23
common carp x goldfish							1			1
emerald shiner		21	6	4	31	1	1	41	7	50
golden shiner								1	2	3
goldfish									1	1
grass carp		1		1	2					
red shiner			1		1					
silver carp		5	3	27	35					
silver chub				1	1					
spotfin shiner								3		3
Hiodontidae										
goldeye		1			1					
Ictaluridae										
blue catfish		1			1					
channel catfish				3	3	4	4	7	10	25
flathead catfish	3				3			1	1	2
Lepisosteidae										
longnose gar	2	5	1	2	10					
shortnose gar	4	10	9	3	26					
Moronidae										
white bass		4	9	4	17	1				1
yellow bass			1		1					
Percidae										
sauger				1	1					
Sciaenidae										
freshwater drum	6	1	3	8	18	1	2		17	20
Total individuals	23	92	67	103	285	27	23	76	49	175
Total species/hybrids	8/0	15/0	12/0	14/0	23/0	13/0	8/1	11/0	10/0	19/1

Table 33. Number of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on four reaches of the Illinois River and two reaches of the Mississippi River during amendment experimental sampling in 2009.

	River, Reach, and Hours Fished							
	Illinois River					Mississippi River		
	Alton	Peoria	Starved Rock	Marseilles	Dresden	Open River	Pool 19	Overall $CPUE_N$
Species	1.5	1.50	0.50	0.50	0.50	1.00	1.00	6.50
Amiidae								
bowfin	2.67							0.15
Catastomidae								
bigmouth buffalo		0.67				1.00		0.31
black buffalo		4.00	8.00			1.00		1.69
golden redhorse		3.33		6.00	42.00			4.46
highfin carpsucker		0.67	6.00					0.62
quillback		0.67	2.00					0.31
river carpsucker	40.00	6.00	26.00	12.00		19.00		9.54
shorthead redhorse	21.33	0.67		10.00	18.00	1.00	2.00	4.00
silver redhorse					12.00			0.92
smallmouth buffalo	2.67	26.00	34.00	16.00	4.00		2.00	10.62
spotted sucker							1.00	0.15
Centrarchidae								
black crappie	5.33						1.00	0.46
bluegill	2.67	8.00		8.00	42.00	4.00	15.00	8.77
green sunfish	2.67	2.00		4.00	10.00		2.00	2.00
largemouth bass	10.67	0.67			20.00		16.00	4.77
orange spotted sunfish	2.67						2.00	0.46
pumpkinseed		0.67			2.00			0.31
rock bass					2.00			0.15
smallmouth bass		2.67	2.00	16.00	32.00		4.00	5.08
Clupeidae								
gizzard shad	32.00	1.33		2.00	16.00	62.00	1.00	13.23
skipjack herring	5.33	2.67						1.08
Cyprinidae								
bluntnose minnow				2.00	98.00			7.69
bullhead minnow				24.00	50.00			5.69
common carp	82.67	9.33	4.00	4.00	8.00	45.00	23.00	18.62
common carp x goldfish							1.00	0.15
common shiner					2.00			0.15
creek chub				2.00				0.15
emerald shiner	2.67	18.00	2.00	6.00		31.00	50.00	17.38
golden shiner					10.00		3.00	1.23
goldfish							1.00	0.15
grass carp	5.33	2.00	4.00			2.00		1.38
red shiner		0.67			4.00	1.00		0.62
river shiner					4.00			0.31
silver carp	26.67	12.00				35.00		9.69
silver chub						1.00		0.15
silverband shiner		0.67						0.15
spotfin shiner	2.67				14.00		3.00	1.69
Gobiidae								
round goby					2.00			0.15

Table 33. (continued)

Number of individuals of each fish species collected per hour of electrofishing (CPUEn) on four reaches of the Illinois River and two reaches of the Mississippi River during amendment experimental sampling in 2009.

	River, Reach, and Hours Fished							
	Illinois River					Mississippi River		
	Alton	Peoria	Starved Rock	Marseilles	Dresden	Open River	Pool 19	Overall $CPUE_N$
Species	1.5	1.50	0.50	0.50	0.50	1.00	1.00	6.50
Hiodontidae								
goldeye	5.33					1.00		0.46
mooneye	2.67	0.67						0.31
Ictaluridae								
blue catfish						1.00		0.15
channel catfish	48.00	4.67	4.00	12.00	2.00	3.00	25.00	9.54
flathead catfish	8.00	0.67	2.00	2.00		3.00	2.00	1.69
Lepisosteidae								
longnose gar		1.33						1.85
shortnose gar	26.67	2.00	2.00			26.00		6.15
Moronidae								
white bass	32.00	21.33	8.00	10.00		17.00	1.00	10.92
white perch		0.67						0.15
yellow bass		0.67				1.00		0.31
Percidae								
sauger		4.00	4.00			1.00		1.38
walleye			2.00					0.15
Sciaenidae								
freshwater drum	53.33	17.33	46.00	48.00	2.00	18.00	20.00	20.31
Total Number per hour	106.00	156.00	156.00	184.00	396.00	285.00	175.00	187.85
Number of species/hybrids	23/0	31/0	16/0	17/0	21/0	23/0	19/0	51/1

Table 34. Pounds of individuals of each fish species collected per hour of electrofishing ($CPUE_N$) on four reaches of the Illinois River and two reaches of the Mississippi River during amendment experimental sampling in 2009.

	River, Reach, and Hours Fished							
	Illinois River					Mississippi River		
Species	Alton 1.5	Peoria 1.50	Starved Rock 0.50	Marseilles 0.50	Dresden 0.50	Open River 1.00	Pool 19 1.00	Overall CPUEN 6.50
Amiidae								
bowfin	3.66							0.21
Catastomidae								
bigmouth buffalo		1.21				4.18		0.92
black buffalo		14.17	12.51			11.66		6.03
golden redhorse		0.84		1.62	20.64			1.90
highfin carpsucker		1.04	3.96					0.54
quillback		0.48	0.55					0.15
river carpsucker	54.22	10.27	42.61	21.34		33.92		15.63
shorthead redhorse	28.44	0.30		6.68	5.84	2.10	0.13	3.02
silver redhorse					7.34			0.56
smallmouth buffalo	3.53	64.37	49.77	23.50	17.07		0.26	22.05
spotted sucker							0.81	0.12
Centrarchidae								
black crappie	1.82						0.11	0.12
bluegill	0.08	0.72		0.80	3.99	0.09	3.03	1.02
green sunfish	0.16	0.15		0.37	0.66		0.07	0.14
largemouth bass	3.35	0.14			6.05		13.70	2.80
orange spotted sunfish	0.09						0.00	0.01
pumpkinseed		0.09			0.06			0.02
rock bass					0.25			0.02
smallmouth bass		1.67	0.82	6.86	9.68		0.11	1.74
Clupeidae								
gizzard shad	1.51	0.39		0.14	2.56	5.69	0.11	1.28
skipjack herring	2.77	1.76						0.60
Cyprinidae								
bluntnose minnow				0.00	0.00			0.00
bullhead minnow				0.11	0.00			0.01
common carp	338.15	45.28	23.75	10.63	31.57	225.35	115.01	87.40
common carp x goldfish							0.46	0.07
common shiner					0.00			0.00
creek chub				0.00				0.00
emerald shiner	0.00	0.00	0.00	0.00		0.00	0.00	0.00
golden shiner					0.18		0.17	0.04
goldfish							1.38	0.21
grass carp	27.67	18.99	2.90			18.57		9.06
red shiner		0.00			0.00	0.00		0.00
river shiner					0.00			0.00
silver carp	73.76	87.37				38.88		30.40
silver chub						0.01		0.00
silverband shiner		0.00						0.00
spotfin shiner	0.00				0.00		0.00	0.00
Gobiidae								
round goby					0.03			0.00

Table 34. (continued)

Pounds of individuals of each fish species collected per hour of electrofishing (CPUEn) on four reaches of the Illinois River and two reaches of the Mississippi River during amendment experimental sampling in 2009.

	River, Reach, and Hours Fished							
	Illinois River					Mississippi River		
	Alton	Peoria	Starved Rock	Marseilles	Dresden	Open River	Pool 19	Overall $CPUE_N$
Species	1.5	1.50	0.50	0.50	0.50	1.00	1.00	6.50
Hiodontidae								
goldeye	0.84					0.11		0.07
mooneye	0.53	0.30						0.10
Ictaluridae								
blue catfish						1.87		0.29
channel catfish	58.73	15.11	16.46	7.63	3.23	3.76	65.07	19.57
flathead catfish	3.94	0.53	5.78	2.88		8.55	0.13	2.35
Lepisosteidae								
longnose gar		0.43						1.63
shortnose gar	50.54	1.37	2.27			15.33		5.77
Moronidae								
white bass	16.33	15.30	4.95	3.26		5.43	0.19	5.97
white perch		0.10						0.02
yellow bass		0.18				0.22		0.08
Percidae								
sauger		1.34	0.89			0.11		0.40
walleye			2.09					0.16
Sciaenidae								
freshwater drum	17.82	12.36	23.18	26.88	2.26	8.10	7.02	10.23
Total Number per hour	687.94	296.26	192.49	112.71	111.41	394.08	207.75	232.69
Number of species/hybrids	23/0	31/0	16/0	17/0	21/0	23/0	19/0	51/1

Table 35. Number and pounds of individuals of each fish species collected per net gear on the Open River - Chain of Rocks area of the Mississippi River during amendment experimental sampling in 2009.

	Mississippi River Open River - Chain of Rocks									
	Small Gill Net		Large Gil Net		Standard Hoop Net		Benthic Hoop Net		Total	
Species	Number	LBS.	Number	LBS.	Number	LBS.	Number	LBS.	Number	LBS.
Catastomidae										
smallmouth buffalo					1	8.2			1	8.2
Cyprinidae										
speckled chub							2	0.0	2	0
Ictaluridae										
blue catfish	1	1.3	1	8.3	2	5.4	2	0.3	6	15.3
channel catfish					1	3.5	2	0.0	3	3.5
flathead catfish					2	9.5	2	1.9	4	10.4
Sciaenidae										
freshwater drum	1	0.8			2	3.0			3	3.8
Total	2	2.1	1	8.3	8	29.6	8	2.2	19	41.2
Number of species	2		1		5		4		6	

We collected a total of 1,221 fish representing 51 species plus one hybrid from 12 families during 6.5 hours of electrofishing. Freshwater drum was the most abundantly collected species representing 10.9% of the total catch, followed by common carp (9.8%), emerald shiner (9.1%), gizzard shad (6.9%), and white bass (5.7%). Common carp were collected at 22 sites, freshwater drum were collected at 20 sites, channel catfish and white bass were collected at 19 sites, and bluegill were collected at 17 sites. A sample from Dresden Reach at river mile 274.0 on the Illinois River yielded the most fish (144, 11.6% of the total collected from all 26 sites; Table 31) and two sites, river mile 220.8 in Peoria Reach and river mile 62.8 in Alton Reach of the Illinois River, yielded the fewest fish (8 total fish each Table 30). The most species found at any given site was 17 collected at two sites, river mile 274.0 in Dresden Reach

and river mile 228.9 in Peoria Reach of the Illinois River (Table 31). The fewest fish species collected at a single site was 7 collected at three sites in Alton Reach of the Illinois River (river miles 55.2, 62.2, and 5.2; Table 30). Two fish species were collected during electrofishing for the first time in F-101-R sampling, blue catfish and spotted sucker. A single blue catfish was collected at river mile 176.4 in the Open River reach and a single spotted sucker was collected at river mile 365.1 in Pool 19 of the Mississippi River (Table 32).

Electrofishing catch in terms of number of fish collected per hour ($CPUE_N$) was highest in Alton Reach of the Illinois River with 424.0 fish per hour recorded (Table 33). Common carp was the most abundant fish species in Alton Reach catches with 82.7 fish collected per hour (19.5% of the total for Alton Reach) followed by freshwater drum (53.3 fish/hr, 12.6% of the total) and channel catfish (48.0 fish/hr, 11.3% of the total). Peoria and Starved Rock reaches had the lowest catches in terms of total number of fish collected per hour. Peoria Reach recorded 156.0 fish per hour with smallmouth buffalo as the most abundant fish species collected (26.0 fish/hr, 16.7% of Peoria Reach total) followed by white bass (21.3 fish per hour, 13.7% of the total) then emerald shiner (18.0 fish/hr, 11.5% of the total). Starved Rock Reach also recorded 156.0 fish per hour with freshwater drum as the most abundant fish species collected (46.0 fish/hr, 29.5% of the Starved Rock Reach total) followed by smallmouth buffalo (34.0 fish/hr, 21.8% of the total) and river carpsucker (26.0 fish/hr, 16.7% of the total). Marseilles Reach collected 184.0 fish per hour with freshwater drum as the most abundant fish species collected (48.0 fish/hr, 26.1% of the Marseilles Reach total) followed by bullhead minnow (24.0 fish/hr) then both smallmouth bass and smallmouth

buffalo each netting 16.0 fish per hour (8.7% of the total). Dresden Reach ranked second in total relative abundance with 396.0 fish collected per hour. Bluntnose minnow were the most abundant fish species collected in Dresden Reach (98.0 fish/hr, 24.7% of the total) followed by bullhead minnow (50.0 fish/hr, 12.6% of the total) then bluegill and golden redhorse both netting 42.0 fish per hour (10.6% of the total). The Open River reach of the Mississippi River recorded the third highest catch in number with 285.0 fish collected per hour. Gizzard shad were the most abundant fish species collected in the Open River (62.0 fish/hr, 21.8% of the total) followed by common carp (45.0 fish/hr, 15.8% of the total) and silver carp (35.0 fish/hr, 12.3% of the total). Pool 19 recorded 175.0 fish per hour with emerald shiner as the most abundant fish species collected (50.0 fish/hr, 28.6% of the total for Pool 19) followed by channel catfish (25.0 fish/hr, 14.3% of the total) and common carp (23.0 fish/hr, 13.1% of the total).

In terms of biomass, we collected 1,512.5 pounds of fish resulting in an overall $CPUE_N$ of 232.7 pounds per hour while electrofishing (Table 34). Common carp biomass was highest over all other fish species resulting in 37.6% of the total biomass (568.1 total pounds) followed by silver carp (197.6 lbs., 13.1% of the total) then smallmouth buffalo (143.3 lbs., 9.5% of the total). Relative biomass in terms of number of pounds collected per hour of electrofishing ($CPUE_W$) was highest in Alton Reach of the Illinois River where a $CPUE_W$ of 687.9 was recorded. Common carp netted the highest catch in weight for Alton Reach at 338.2 pounds per hour (49.2% of the total) followed by silver carp (73.8 lbs./hr, 10.7% of the total) and channel catfish (58.7 lbs./hr, 8.5% of the total). Relative biomass in Peoria Reach ranked third with a $CPUE_W$ of 296.3 pounds per hour. Silver carp netted the highest $CPUE_W$ in Peoria Reach at 87.4

pounds per hour (29.5% of the total) followed by smallmouth buffalo (64.4 lbs./hr, 21.7% of the total) then common carp (45.3 lbs./hr, 15.3% of the total). Starved Rock Reach relative biomass was 192.5 pounds per hour with smallmouth buffalo netting the highest $CPUE_W$ at 49.8 pounds per hour (25.9% of the total) followed by river carpsucker (42.6 lbs./hr, 22.1% of the total) and common carp (23.8 lbs./hr, 12.3% of the total). Marseilles Reach relative biomass was 112.7 pounds per hour with freshwater drum netting the highest $CPUE_W$ at 26.9 pounds per hour (23.8% of the total) followed by smallmouth buffalo (23.5 lbs./hr, 20.8% of the total) and river carpsucker (21.3 lbs./hr, 18.9% of the total). The lowest catch in weight occurred in Dresden Reach where a $CPUE_W$ of 111.4 pounds per hour was recorded. Common carp netted the highest relative biomass in Dresden Reach with a $CPUE_W$ of 31.6 pounds per hour (28.3% of the total) followed by golden redhorse (20.6 lbs./hr, 18.5% of the total) then smallmouth buffalo (17.1 lbs./hr, 15.3% of the total). The Open River reach on the Mississippi River recorded the second highest relative biomass of all reaches with a $CPUE_W$ of 394.1 pounds per hour. Common carp relative biomass was highest of all fish species in the Open River with a $CPUE_W$ of 225.4 pounds per hour (57.2% of the total) followed by silver carp (38.9 lbs./hr, 9.9% of the total) and river carp sucker (33.9 lbs./hr, 8.6% of the total). Pool 19 recorded a $CPUE_W$ of 207.8 pounds per hour with common carp relative biomass the highest over all fish species at 115.0 pounds per hour (55.4% of the total) followed by channel catfish (65.1 lbs./hr, 31.3% of the total) and largemouth bass (13.7 lbs./hr, 6.6% of the total).

Gill and Hoop Netting Results

Gill and hoop net collections were conducted 23 June to 25 June 2009. Gill netting was conducted 23 June 2009 between the hours of 8:00 a.m. and 11:40 a.m. central standard time. Hoop netting was conducted as 48 hour sets beginning 23 June between 9:05 a.m. and 10:00 a.m. and ending June 25 between 9:55 a.m. and 11:35 a.m. central standard time. Mean physical measurements for ancillary water quality parameters recorded at onset of net sampling were as follows: water temperature, 79.7 F; dissolved oxygen concentration, 5.3 ppm; Secchi disk transparency, 6.3 cm; conductivity, 491 µhos/cm; surface velocity, 0.8 ft/s; water depth, 14.0 ft (Table 29).

We collected a total of 19 fishes representing 6 species from 4 families during a total of 12 gill and hoop nets sets (Table 35). Ictalurids (blue catfish, channel catfish, and flathead catfish) represented the majority of the net samples with a total of 13 (68.4% of the total fish collected) catfishes collected weighing 29.2 pounds (70.9% of the total weight of fish collected). Two fish species, speckled chub and blue catfish, were species collected for the first time in F-101-R sampling. Two specimens of speckled chub were collected in a single benthic hoop net set and four blue catfish were collected in three separated standard hoop net sets. Four net sets collected no fish; a large mesh gill net and three standard hoop nets.

CONCLUSIONS

Samples collected by electrofishing on the Illinois Waterway during August, September, and October 2004-2008 provided evidence of continued increases in fish species richness and catch rates. A total of 102 species and seven hybrids have been collected since William Starrett began this survey in 1957. Eighty-seven species and six hybrids have been documented by project F-101-R sampling (1989-present); 78 species and three hybrids from 16 families were collected from 2004-2008 during 130.7 hours of electrofishing. Nine species plus one new hybrid were collected for the first time during project F-101-R sampling along the waterway in the 2004-2008 period; banded killifish, blacknose dace, blackside darter, creek chub, common shiner, longnose dace, ribbon shiner, round goby, southern redbelly dace, and yellow bass x white perch hybrid. Nine specimens of round goby were collected at three sample sites in two reaches in 2004. Two specimens of round goby were collected at Ballard's Island in Marseilles Reach, four specimens were collected at the Mouth of the Du Page River, with three specimens collected at Treat's Island in Dresden Reach. A single specimen of ribbon shiner was also collected at Treat's Island in 2004. A single specimen of blacknose dace was collected at two sites in 2005, one each at Bull's Island and Bull's Island Bend in Starved Rock Reach. Five specimens of creek chub were collected at Bull's Island in 2005. Fourteen specimens of common shiner were collected at four sites in four reaches in 2005; five individuals were collected at the Mouth of the Du Page River in Dresden Reach, one individual was collected at

Waupecan Island in Marseilles Reach, seven individuals were collected at Bull's Island in Starved Rock Reach, and one individual was collected at Hennepin Island in Peoria Reach. Two specimens of banded killifish were collected at Bull's Island in Starved Rock Reach, while a single specimen each of yellow bass x white perch hybrid was collected at Turkey Island and Pekin sites in La Grange Reach in 2006. A single specimen of southern redbelly dace was collected at Henry Island in Peoria Reach in 2007. Four specimens of blackside darter were collected at three sites in two reaches in 2008; a single individual was collected at Bull's Island Bend in Starved Rock Reach, a single individual at Waupecan Island in Marseilles Reach, and two individuals at Treat's Island in Dresden Reach. Two specimens of longnose dace were collected at Waupecan Island in Marseilles Reach in 2008.

Common carp have continued to show a general decline throughout the waterway during much of F-101-R sampling. However, common carp have shown a slight increase in catch in 2007 and 2008 for the Upper and Middle Waterway and an increase in catch in the Lower Waterway in 2008. Goldfish, which were once abundant in the Upper Waterway and had only two fish collected from this portion of the waterway from 1999-2003, have begun to show an increase in catch in the Middle and Upper Waterway segments (McClelland and Pegg 2004). Silver carp are one of the newest non-native fish species collected by F-101-R sampling to the Illinois River Waterway entering the system by way of the Mississippi River. Silver carp were first collected in 2001 in the Lower Waterway during F-101-R sampling followed by collections in the Middle Waterway in 2002 (McClelland and Pegg 2002, 2003). Though silver carp collections were low during the 1999-2003 period, collections during 2004-2008 have

shown steady increases in both the Lower and Middle River (McClelland and Pegg 2004). Small cyprinid species such as bluntnose minnow, bullhead minnow, emerald shiner, and spotfin shiner continued to show comparably high numbers in the Upper Waterway throughout the 2004-2008 segment compared to previous years and the Lower and Middle Waterway. Catches for bluntnose minnow, emerald shiner, and spotfin shiner all generally increased during 2004-2008. Spotfin shiner collections prior to 2002 were uncommon in the Upper Waterway; however, steady increases in catch during the 2004-2008 period have placed spotfin shiner among the top ranking fish species in the Upper Waterway.

As in previous years, a high degree of variability in species richness among sites and also among river reaches was evident throughout the 2004-2008 sampling segment. Some of this variability can be explained by sampling duration (site comparisons) or the number of sites sampled within reaches (reach comparisons), but there is also evidence that some of the sampling sites are inherently lower in species richness than others. At most sites, an average of over 15 species was collected during 2004-2008. However, at Johnson Island (RM 249.6, Marseilles Reach), Turkey Island (RM 148.0, LaGrange Reach), and Moore's Towhead (RM 75.3, Alton Reach), the average was 13 species or lower (Appendix F). The low species richness observed at Johnson and Turkey Island sites may be attributed to the fact that these two sites can no longer be sampled to their full extent during low, stable water conditions as degradation of the side channel habitat has occurred due to sedimentation. The low species richness of Moore's Towhead sites is likely due to their location, as it is one of two true main channel sites sampled and the habitat is monotypic, having no structure

such as snags or rocks for fish to utilize. Peoria Reach continues to produce the highest number of species along the waterway with an average of 39 species per year during 2004-2005. This could be due, in part, to a greater number of sites in this reach, varied site types (backwater and side channel), and its position along the waterway, which includes the Great Bend (above Hennepin) of the Illinois River. This reach represents a transition from a river which is constricted, lacks contiguous backwaters, and is high in gradient (upper river) to a large river flood plain system with low gradient (lower river; Sparks 1977).

The relative biomass of fishes collected from 2004-2008 was also highest in Peoria Reach, where the total $CPUE_W$ was 127.2 pounds per hour. Species accounting for this high catch in weight were the large bodied fish species common carp (27.9 lbs./hr), bigmouth buffalo (20.8 lbs./hr), silver carp (20.5 lbs./hr), smallmouth buffalo (19.2 lbs./hr), and channel catfish (9.1 lbs./hr). Catch weight was also relatively high in La Grange Reach and Dresden Reach with 85.3 and 62.8 total pounds per hour collected, respectively. Of the 10,053.9 pounds of fish collected on the Illinois River Waterway during the 2004-2008 survey segment, 7,347.9 pounds (73.1%) were collected from the Middle Waterway, while the Lower Waterway produced 1,449.8 pounds (14.4%) and the Upper Waterway produced 1,256.2 pounds (12.5%). In addition to the increased contribution to catch in numbers of silver carp to the Lower and Middle Waterway, biomass contributions have also been substantial during the 2004-2008 period with a total biomass catch of 2,038.9 pounds comprising 20.3% of the total biomass for the entire Illinois River Waterway and 23.2 % of the biomass for the Lower and Middle Waterway segments. Silver carp biomass observations were

second only to common carp collections throughout the waterway (2,357.0 total pounds, 23.4% of the total), but ranked first in the Lower and Middle Waterway segments. Bigmouth buffalo were not collected in the Upper Waterway during 2004-2008, but contributed 979.3 total pounds of biomass to the entire waterway (9.7% of the total) and comprised 11.1% of the Lower and Middle Waterway biomass. These catches continue to reflect the high productivity of the middle and lower Illinois River flood plain ecosystem.

Sport fishes were collected throughout the Waterway during all five years of this segment (2004-2008), although catch rate in number and weight varied among reaches. For channel catfish, we continued to collect more individuals per hour in the Alton Reach (Lower Waterway) than in the Middle or Upper Waterway reaches, while catch in weight was highest in the Middle Waterway. White bass collections in terms of $CPUE_N$ and $CPUE_W$ continued to be highest in the middle river; $CPUE_N$ was highest in the LaGrange Reach while $CPUE_W$ was equal for both La Grange and Peoria reaches. Black crappie were most abundant in the Middle Waterway and provided the highest catches in number in La Grange and Peoria reaches and weight in Peoria Reach. Similar to previous years, bluegill $CPUE_N$ and $CPUE_W$ were greatest in Dresden Reach in the upper waterway. In the 2004-2008 segment, we recorded the highest single collection for largemouth bass. Catch in number for Starved Rock Reach in 2005 was the highest recorded in F-101-R sampling (McClelland and Cook 2006). Largemouth bass $CPUE_N$ in Dresden Reach in 2007 and La Grange Reach in 2008 were also the highest catch rates recorded for these reaches in F-101-R sampling (McClelland and Sass 2008, 2009). Overall, largemouth bass $CPUE_N$ and $CPUE_W$ continued to be

highest in the Upper Waterway in Dresden Reach during 2004-2008. As in previous years of project F-101-R sampling, we collected only low numbers of sauger. Smallmouth bass, which are usually found in low numbers, were collected in every reach of the upper river and in the Peoria Reach of the middle river for all years.

Fish sampling conducted in May and June of 2009 for amendment procedures to the Long-Term Illinois River Fish Population Monitoring Program provided essential information towards establishing additional protocols to the existing monitoring program for the Illinois and Mississippi rivers. The 46 species representing 12 families collected during 4.5 hours of pulsed-DC electrofishing on the Illinois River Waterway provided further information of fish communities throughout the waterway. Catch rates observed on the Illinois River Waterway by the pulsed-DC electrofishing for most fish species were consistent with those of the current program's AC electrofishing. Several fish species did exhibit considerable differences in catch rates between pulsed-DC and AC electrofishing. Black buffalo, golden redhorse, river carpsucker, shorthead redhorse, and smallmouth bass catch rates during the 2009 pulsed-DC electrofishing were all much higher than the values normally recorded during AC electrofishing. Biomass collections also exhibited differences in catch for a number of fish species between pulsed-DC and AC electrofishing. Catches in weight for black buffalo, common carp, freshwater drum, grass carp, river carp sucker, silver carp, shortnose gar, smallmouth bass, smallmouth buffalo, and white bass were all much higher than values normally recorded during AC electrofishing.

Collections made on the Mississippi River in the Open River-Chain of Rocks area and Pool 19 provided records of fish species that have not been collected during previous F-101-R sampling. We collected 34 fish species plus one hybrid from 10 families in our Mississippi River pulsed-DC electrofishing, gill nets, and hoop nets. A single specimen each of blue catfish and spotted sucker were collected for the first time in F-101-R sampling using pulsed-DC electrofishing; blue catfish were collected in the Open River while spotted sucker were collected in Pool 19. In addition to new collections of blue catfish and spotted sucker program-wide, four fish species (black buffalo, goldfish, longnose gar, and skipjack herring) collected in Mississippi River pulsed-DC electrofishing have not been collected at our Mississippi River reference site at Brickhouse Slough while AC electrofishing during F-101-R sampling over all years.

Our net sampling effort produced relatively few fish species and few total fish (six fish species and 19 total fish), but produced two fish species new to F-101-R sampling. In addition to pulsed-DC electrofishing, blue catfish were also collected in large mesh gill nets (one specimen), small mesh gill nets (one specimen), benthic hoop nets (two specimens), and standard hoop nets (two specimens). Speckled chub were also collected for the first time in F-101-R sampling by benthic hoop net in the Open River. Three net sets produced no fish, one large mesh gill net and two standard hoop nets. The low abundances observed by net collections may be attributed to timing or location as only one location was sampled during a single 48 hour period. The ability of the net gears to collect fish species new to F-101-R will likely be important as these techniques are perfected in the future.

The results of the experimental pulsed-DC electrofishing and net sampling for the amendment procedures to the Long-Term Illinois River Fish Population Monitoring Program provided the information necessary to illustrate the need for additional monitoring on the Illinois and Mississippi Rivers as differences in catch rates and the collection of new fish species were observed.

LITERATURE CITED

Anderson, R.O., and R. M. Neuman. 1996. Length, Weight, and Associated Structural Indices: Pages 447-482 in B.R. Murphy and D.W. Willis, editors. Fisheries Techniques, Second Edition. American Fisheries Society, Bethesda, Maryland.

Arnold, J.L., T.M. Koel, and R.E. Sparks. 2000. The long-term Illinois River fish population monitoring program. Project F-101-R-11 Annual Report. Center for Aquatic Ecology Technical Report 00/05. Illinois Natural History Survey, Champaign. 36pp.

Gutreuter, S., R. Burkhardt, and K. Lubinski. 1995. Long Term Resource Monitoring Program Procedures: Fish Monitoring. National Biological Service, Environmental Management Technical Center, Onalaska, WI, July 1995. LTRMP 95-P002-1. 42 pp. + Appendices A-J.

Koel, T.M., R.E. Sparks, and K.D. Blodgett. 1998. The long-term Illinois River fish population monitoring program. Project F-108-R-9 Annual Report. Center for Aquatic Ecology Technical Report 98/8. Illinois Natural History Survey, Champaign. 35 pp.

Koel, T.M., R.E. Sparks, K.D. Blodgett, and S.D. Whitney. 1997. The long-term Illinois River fish population monitoring program (F-101-R-8). Annual Report to the Illinois Department of Natural Resources. Aquatic Ecology Technical Report 97/14. Illinois Natural History Survey, Champaign. 35 pp.

Koel, T.M., and R.E. Sparks. 1999. The long-term Illinois River fish population monitoring program (F-101-R). Final Report to the Illinois Department of Natural Resources. Aquatic Ecology Technical Report 99/15. Illinois Natural History Survey, Champaign. 60 pp.

Kofoid, C.A. 1903. Plankton studies. IV. The plankton of the Illinois River, 1894-1899, with introductory notes upon the hydrography of the Illinois River and its basin. Part I. Quantitative investigations and general results. Illinois State Laboratory of Natural History Bulletin 6(2):95-635.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1993. The long-term Illinois River fish population monitoring program (F-101-R). Annual Report to the Illinois Department of Conservation. Aquatic Ecology Technical Report 93/3. Illinois Natural History Survey, Champaign. 76 pp.

Lerczak, T.V. and R.E. Sparks. 1994. Fish populations in the Illinois River. Pages 239-241 *in* K.P. Pabich, editor. The changing Illinois environment: critical trends, volume 3, ecological resources. ILENR/RE-EA-95/05. Illinois Department of Energy and natural Resources, Springfield.

Lerczak, T.V., and R.E. Sparks, and K.D. Blodgett. 1994. The long-term Illinois River fish population monitoring program (F-101-R). Final Report to the Illinois Department of Conservation. Aquatic Ecology Technical Report 94/5. Illinois Natural History Survey, Champaign. 105 pp.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1995. The long-term Illinois River fish population monitoring program (F-101-R-6). Annual Report to the Illinois Department of Conservation. Aquatic Ecology Technical Report 95/4. Illinois Natural History Survey, Champaign. 38 pp.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1996. The long-term Illinois River fish population monitoring program (F-101-R-7). Annual Report to the Illinois Department of Natural Resources. Aquatic Ecology Technical Report 96/2. Illinois Natural History Survey, Champaign. 38 pp.

McClelland, M.A. and G.G. Sass. 2009. The long-term Illinois River fish population monitoring program. Annual Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 09/7. 56pp.

McClelland, M.A. and G.G. Sass. 2008. The long-term Illinois River fish population monitoring program. Annual Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 08/10. 57pp.

McClelland, M.A. and G.G. Sass. 2007. The long-term Illinois River fish population monitoring program. Annual Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 07/24. 53pp.

McClelland, M.A. and T.R. Cook. 2006. The long-term Illinois River fish population monitoring program. Annual Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 06/3. 53pp.

McClelland, M.A. and M.A. Pegg. 2005. The long-term Illinois River fish population monitoring program. Project F-101-R-16 Annual Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 05/8. 50 pp.

McClelland, M.A. and M.A. Pegg. 2004. The long-term Illinois River fish population monitoring program final report (1999-2003). Final Report to the Illinois Department of Natural Resources. Illinois Natural History Survey, Aquatic Ecology Technical Report 04/3. 82pp.

McClelland, M.A., and M.A. Pegg. 2003. The long-term Illinois River fish population monitoring program. Project F-101-R-14 Annual Report to the Illinois Department of Natural Resources.. Center for Aquatic Ecology Technical Report 03/5. Illinois Natural History Survey, Champaign. 48 pp.

McClelland, M.A., and M.A. Pegg. 2002. The long-term Illinois River fish population monitoring program. Project F-101-R-13 Annual Report to the Illinois Department of Natural Resources.. Center for Aquatic Ecology Technical Report 02/5. Illinois Natural History Survey, Champaign. 46 pp.

McClelland, M.A., and M.A. Pegg. 2001. The long-term Illinois River fish population monitoring program. Project F-101-R-12 Annual Report to the Illinois Department of Natural Resources.. Center for Aquatic Ecology Technical Report 01/5. Illinois Natural History Survey, Champaign. 35 pp.

Pflieger, W.L. 1975. The fishes of Missouri. Missouri Department of Conservation. 343 pp.

Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. Common and scientific names of fishes from the United States and Canada. Special Publication number 20. American Fisheries Society, Bethesda, MD

Sparks, R.E. 1977. Environmental inventory and assessment of navigation pools 24, 25, and 26, Upper Mississippi and lower Illinois Rivers: an electrofishing survey of the Illinois River, Special Report No. 5 Water Resources Center, University of Illinois, Urbana. 82 pp.

Sparks, R.E. and W.C. Starrett. 1975. An electrofishing survey of the Illinois River, 1959-1974. Illinois Natural History Survey Bulletin 31:317-380.

Sparks, R.E. and T.V. Lerczak. 1993. Recent trends in the Illinois River indicated by fish populations. Aquatic Ecology Technical Report 93/16. Illinois Natural History Survey, Champaign. 34 pp.

APPENDIX A. Fish species collected during Long-term Monitoring of the Illinois Waterway, 1957-2008. Common names marked by an asterisk indicate species that were collected from 1989 through 2008 during federal aid project F-101-R. Common and scientific names are from Robins et al. (1991) and Cross et al. (1995). Habitat associations are based on behavioral descriptions from Pflieger (1975), Cross et al. (1995) and communications with INHS fisheries biologists.

Family Name	Common Name	Scientific Name	Habitat Association (B=benthic)
Lepisosteidae	longnose gar*	*Lepisosteus osseus*	
	shortnose gar*	*Lepisosteus platostomus*	
	spotted gar*	*Lepisosteus oculatus*	
Amiidae	bowfin*	*Amia calva*	
Hiodontidae	goldeye*	*Hiodon alosoides*	
	mooneye*	*Hiodon tergisus*	
Anguillidae	American eel	*Anguilla rostrata*	
Clupeidae	gizzard shad*	*Dorosoma cepedianum*	
	skipjack herring*	*Alosa chrysochloris*	
	threadfin shad*	*Dorosoma petenense*	
Cyprinidae	bighead carp*	*Hypophthalmichthys nobilis*	
	bigmouth shiner*	*Notropis dorsalis*	B
	blacknose dace*	*Rhinichthys atratulus*	B
	bluntnose minnow*	*Pimephales notatus*	
	bullhead minnow*	*Pimephales vigilax*	
	central stoneroller*	*Campostoma anomalum*	B
	common carp*	*Cyprinus carpio*	B
	common carp x goldfish*	*Cyprinus carpio x Carassius aurtatus*	B
	common shiner*	*Luxilus cornutus*	
	creek chub*	*Semotilus atromaculatus*	
	emerald shiner*	*Notropis atherinoides*	
	fathead minnow*	*Pimephales promelas*	
	ghost shiner	*Notropis buchanani*	
	golden shiner*	*Notemigonus crysolucas*	
	goldfish*	*Carassius auratus*	B
	grass carp*	*Ctenopharyngodon idella*	
	hornyhead chub	*Nocomis biguttatus*	
	longnose dace*	*Rhinichthys cataractae*	B
	Mississippi silvery minnow	*Hybognathus nuchalis*	B
	pugnose minnow	*Opsopoeodus emiliae*	
	redfin shiner	*Lythrurus umbratilis*	
	red shiner*	*Cyprinella lutrensis*	
	ribbon shiner*	*Lythrurus fumeus*	
	river shiner*	*Notropis blennius*	
	sand shiner*	*Notropis stramineus*	
	silverband shiner*	*Notropis shumardi*	
	silver carp*	*Hypophthalmichthys molitrix*	
	silver chub*	*Hybopsis storeriana*	B
	silverjaw minnow	*Notropis buccatus*	B
	southern redbelly dace*	*Phoxinus erythrogaster*	
	speckled chub*	*Extrarius aestivalis*	
	spotfin shiner*	*Cyprinella spiloptera*	
	spottail shiner*	*Notropis hudsonius*	
	steelcolor shiner	*Cyprinella whipplei*	
	striped shiner*	*Luxilus chrysocephalus*	
	suckermouth minnow*	*Phenacobius mirabilis*	B

Appenidix A Continued.

Family Name	Common Name	Scientific Name	Habitat Association (B=benthic)
Catostomidae	bigmouth buffalo*	*Ictiobus cyprinellus*	B
	black buffalo*	*Ictiobus niger*	B
	black redhorse	*Moxostoma duzuesnei*	B
	golden redhorse*	*Moxostoma erythrurum*	B
	highfin carpsucker*	*Carpoides velifer*	B
	northern hogsucker*	*Hypentelium nigricans*	B
	quillback*	*Carpoides cyprinus*	B
	river carpsucker*	*Carpoides carpio*	B
	river redhorse	*Moxostoma carinatum*	B
	shorthead redhorse*	*Moxostoma macrolepidotum*	B
	silver redhorse*	*Moxostoma anisurum*	B
	smallmouth buffalo*	*Ictiobus bubalus*	B
	spotted sucker*	*Minytrema melanops*	
	white sucker*	*Catostomus commersoni*	B
Ictaluridae	black bullhead*	*Ameiurus melas*	B
	blue catfish*	*Ictalurus furcatus*	B
	brown bullhead*	*Ameiurus nebulosus*	B
	channel catfish*	*Ictalurus punctatus*	B
	flathead catfish*	*Pylodictis olivaris*	B
	freckled madtom*	*Noturus nocturnus*	B
	tadpole madtom*	*Noturus gyrinus*	B
	white catfish	*Ameiurus catus*	B
	yellow bullhead*	*Ameiurus natalis*	B
Esocidae	grass pickerel*	*Esox americanus vermiculatus*	
	nothern pike	*Esox lucius*	
Salmonidae	rainbow trout	*Oncoryhnchus mykiss*	
Percopsidae	trout-perch	*Percopsis omiscomaycus*	B
Fundulidae	banded killifish*	*Fundulus diaphanus*	
	blackstripe topminnow*	*Fundulus notatus*	
Poeciliidae	western mosquitofish*	*Gambusia affinis*	
Atherinidae	brook silverside*	*Labidesthes sicculus*	
Moronidae	striped bass	*Morone saxatilis*	
	striped bass x white bass*	*Morone saxatilis x M. chrysops*	
	white bass*	*Morone chrysops*	
	white perch*	*Morone americana*	
	yellow bass*	*Morone mississippiensis*	
	yellow bass x white perch*	*Morone mississippiensis x M. americana*	

Appenidix A Continued.

Family Name	Common Name	Scientific Name	Habitat Association (B=benthic)
Centrarchidae	black crappie*	*Pomoxis nigromaculatus*	
	bluegill*	*Lepomis macrochirus*	
	bluegill x green sunfish*	*Lepomis macrochirus x L. cyanellus*	
	green sunfish*	*Lepomis cyanellus*	
	largemouth bass*	*Micropterus salmoides*	
	longear sunfish*	*Lepomis megalotis*	
	orangespotted sunfish*	*Lepomis humilis*	
	orangespotted sunfish x bluegill*	*Lepomis humilis x L. macrochirus*	
	orangespotted sunfish x green sunfish*	*Lepomis humilis x L. cyanellus*	
	pumpkinseed*	*Lepomis gibbosus*	
	pumpkinseed x green sunfish*	*Lepomis gibbosus x L. cyanellus*	
	redear sunfish*	*Lepomis microlophus*	
	rock bass*	*Ambloplites rupestris*	
	smallmouth bass*	*Micropterus dolomieu*	
	spotted sunfish*	*Lepomis punctatus*	
	warmouth*	*Lepomis gulosus*	
	white crappie*	*Pomoxis annularis*	
Percidae	blackside darter*	*Percina maculata*	B
	bluntnose darter	*Etheostoma chlorosomum*	B
	johnny darter*	*Etheostoma nigrum*	B
	logperch*	*Percina caprodes*	B
	mud darter*	*Etheostoma asprigene*	B
	sauger*	*Stizostedion canadense*	
	slenderhead darter*	*Percina phoxocephala*	B
	walleye*	*Stizostedion vitreum*	
	yellow perch*	*Perca flavescens*	
Sciaenidae	freshwater drum*	*Aplodinotus grunniens*	B
Gobiidae	round goby*	*Neogobius melanostomus*	B

APPENDIX B. Species richness (S) at fixed AC electrofishig sites of the Long-Term Illinois River Fish Population Monitoring Program (F-101-R).

Description	Site #	Reach	Low S (year)		High S (year)	
Treats Island	279.8	3	10	(2003)	20	(2007)
Du Page River	277.4	3	11	(1999, 200	20	(2006)
Waupecan Island	260.6	4	11	(1996)	25	(2008)
Johnson Island	249.6	4	6	(1993)	16	(1995, 2008)
Ballards Island	248.0	4	10	(1991)	23	(2007, 2008)
Bulls Island Bend	241.5	5	8	(1990)	25	(2007)
Bulls Island	240.8	5	8	(1990, 96,	21	(2007)
Clark Island	215.3	6	11	(1990)	27	(2007, 2008)
Hennepin	207.6	6	2	(1990)	27	(2007)
Upper Twin Sister	203.3	6	8	(1990)	22	(2001, 2008)
Lower Twin Sister	202.8	6	7	(1992)	22	(2007)
Henry Island	193.8	6	12	(1991)	24	(2005)
Chillicothe	180.6	6	14	(1989,91,9	26	(2006)
Lambie's Boat Harbor	170.3	6	9	(1989)	22	(2006, 2008)
Lower Peoria Lake	163.3	6	10	(1989)	21	(2008)
Pekin	155.1	7	6	(1992)	19	(2005)
Turkey Island	148.0	7	8	(2004)	18	(2007)
Upper Bath Chute	113.0	7	12	(1994)	22	(2001, 2007)
Lower Bath Chute	107.1	7	9	(1992)	26	(2008)
Sugar Creek Island	95.1	7	10	(1989, 199	25	(2008)
Grape-Bar Islands	86.5	7	7	(1989)	25	(2008)
Moore's Towhead	75.3	8	6	(2002)	17	(2004, 2005)
Big Blue Island	58.3	8	9	(1990)	20	(2005, 2006)
Crater-Willow Islands	30.0	8	11	(2003)	19	(2007)
Hurricane Island	26.8	8	11	(1990, 199	20	(1997)
Dark Chute	24.7	8	11	(1994, 200	18	(2006)
Mortland Island	19.0	8	10	(2003)	19	(2006)
Brickhouse Slough	0.0	26	10	(1990)	20	(2005)

[1]Sites 0.0,26.8-215.3 were not sampled during 1993 (n=19 years) (sites 240.8-279.8 n=20 years).

[2]Sites 19.0, 24.7 were not sampled during 1993, 2008 (n=18 years)

APPENDIX C. Total catch (C) at fixed AC electrofishing sites of the Long-term Illinois River Fish Population Monitoring Program (F-101-R).

Description	Site #	Reach	Low C (year)		High C (year)	
Treats Island	279.8	3	55	(1996)	586	(1995)
Du Page River	277.4	3	88	(1991)	614	(1995)
Waupecan Island	260.6	4	35	(1996)	266	(2006)
Johnson Island	249.6	4	15	(2003)	224	(2007)
Ballards Island	248.0	4	34	(1991)	492	(2005)
Bulls Island Bend	241.5	5	36	(1990)	897	(1995)
Bulls Island	240.8	5	32	(1990)	919	(2006)
Clark Island	215.3	6	45	(1991)	735	(2008)
Hennepin	207.6	6	2	(1990)	523	(2005)
Upper Twin Sister	203.3	6	33	(1990)	222	(2007)
Lower Twin Sister	202.8	6	33	(1990)	218	(2001)
Henry Island	193.8	6	54	(1990)	474	(1996)
Chillicothe	180.6	6	80	(1992)	331	(2007)
Lambie's Boat Harbor	170.3	6	47	(2003)	2293	(2007)
Lower Peoria Lake	163.3	6	83	(1991)	507	(2005)
Pekin	155.1	7	22	(1992)	524	(1996)
Turkey Island	148.0	7	30	(1992)	165	(1995)
Upper Bath Chute	113.0	7	80	(2002, '03)	581	(2007)
Lower Bath Chute	107.1	7	57	(1992)	701	(2007)
Sugar Creek Island	95.1	7	37	(2003)	238	(1996)
Grape-Bar Islands	86.5	7	42	(1990)	538	(2008)
Moore's Towhead	75.3	8	31	(2003)	263	(2005)
Big Blue Island	58.3	8	25	(1990)	240	(2005)
Crater-Willow Islands	30.0	8	57	(2003)	207	(1994)
Hurricane Island	26.8	8	50	(1999)	304	(2005)
Dark Chute	24.7	8	47	(2004)	237	(1991)
Mortland Island	19.0	8	28	(2004)	195	(1991)
Brickhouse Slough	0.0	26	53	(1996)	267	(2006)

[1]Sites 0.0,26.8-215.3 were not sampled during 1993 (n=19 years) (sites 240.8-279.8 n=20 years).

[2]Sites 19.0, 24.7 were not sampled during 1993, 2008 (n=18 years)

Appendix D (Job 5). Publications, reports, and presentations that resulted from research conducted during segments 6-15 of project F-101-R, the Long-term Illinois River Fish Population Monitoring Program (funded under Federal Aid in Sportfish Restoration Act, P.L. 81-681, Dingell-Johnson, Wallup-Breaux).

I. Publications

Irons, Kevin S., Timothy M. O'Hara, Michael A. McClelland, and Mark A. Pegg. 2002. White Perch Occurrence, Spread, and Hybridization in the Middle Illinois River, Upper Mississippi River System. Transactions of the Illinois State Academy of Science. 95/3:207-214.

Irons, Kevin S., Michael A. McClelland**,** and Mark A. Pegg. 2006. Expansion of Round Goby in the Illinois Waterway. American Midland Naturalist. 156(1):198-200.

Irons, K.S., G.G. Sass, M.A. McClelland, and J.D. Stafford. 2007. Reduced Condition Factor of Two Native Fish Species Coincident with Invasion of Non-native Asian Carps in the Illinois River, USA: Evidence for Competition and Reduced Fitness? Journal of Fish Biology 71 (Supplement D), 258-273.

Koel, T.M. and Richard E. Sparks. 2000. Ecohydrology of the Illinois River and development of ecological criteria for operation of dams. Regulated Rivers: Research and Management.

Koel, T.M. 2000. Ecohydrology and development of ecological criteria for operation of dams. Project Status Report 2000-02. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, Onalaska, Wisconsin.

Koel, T.M. 2000. Abundance of age-0 fishes correlated with hydrologic indicators. Project Status Report 2000-03. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, Onalaska, Wisconsin.

Koel, T.M. 1998. Channel catfish (*Ictalurus punctatus*) in the Upper Mississippi River System. Project Status Report 98-11. U.S. Geological Survey, Environmental Management Technical Center, Onalaska, Wisconsin.

Koel, T.M., R. Sparks, and R.E. Sparks. 1998. Channel catfish in the Upper Mississippi River System. Survey Report No. 353. Illinois Natural History Survey, Champaign.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1994. Some upstream-to-downstream differences in Illinois River fish communities. Transactions of the Illinois State Academy of Science 87(Supplement):53. (Abstract)

Lerczak, T.V. 1995. Fish community changes in the Illinois River, 1962-1994. American Currents (Summer Issue).

Lerczak, T.V. 1995. The gizzard shad in nature's economy. Illinois Audubon. (Summer Issue). Reprinted in Big River 2(12):1-3.

Lerczak, T.V., and R.E. Sparks. 1995. Fish populations in the Illinois River. Pages 7-9 in G.S. Farris, editor. Our living resources 1994. National Biological Survey, Washington, D.C.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1995. Long-term trends (1959-1994) *in* fish populations of the Illinois River. Transactions of the Illinois State Academy of Science 88(Supplement):74. (Abstract)

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. 1995. Long-term trends (1959-1994) in fish populations of the Illinois River with emphasis on upstream-to-downstream trends. Proceedings of the Mississippi River Research Consortium 27:62-63.

Lerczak, T.V. 1996. Illinois River fish communities: 1960's versus 1990's. Illinois Natural History Survey Report No. 339.

McClelland, Michael A., Mark A. Pegg, and Timothy W. Spier. 2006. Longitudinal Patterns of the Illinois Waterway Fish Community. Journal of Freshwater Ecology. 21/1:91-99.

Pegg, M.A. and R.M. Taylor. 2006. Fish Species Diversity Among Spatial Scales of Altered Temperate Rivers. Journal of Biogeography 34:549-558.

Pegg, M.A. and M.A. McClelland. 2004. Assessment of spatial and temporal fish community patterns in the Illinois River. Ecology of Freshwater Fish 13:125-135.

Pegg, M. A. 2002. Invasion and transport of non-native aquatic species in the Illinois River. Pages 203-209 in A.M. Strawn, editor. Proceedings of the 2001 Governor's conference on the management of the Illinois River System, Special Report Number 27, Illinois Water Resources Center, Champaign, Illinois.

Raibley, P.T., K.D. Blodgett, and R.E. Sparks. 1995. Evidence of grass carp (*Ctenopharyngodon idella*) reproduction in the Illinois and upper Mississippi Rivers. Journal of Freshwater Ecology 10:65-74.

Sparks, R.E. 1995. Value and need for ecosystem management of large rivers and their floodplains. Bioscience 45:168-182.

Sparks, R.E. 1995. Environmental effects. Pages 132-162 *in* S.A. Changnon, editor. The great flood of 1993. University Corporation for Atmospheric Research (UCAR) and Westview Press.

Yang, Yi-Chen E., Ximing Cai, and Edwin E. Herricks. 2008. Identification of Hydrologic Indicators Related to Fish Diversity and Abundance: A Data Mining Approach for Fish Community Analysis. Water Resources Research 44, W04412, doi:10.1029/2006WR005764.

II. Essays

Pegg, M.A. 2002. Aquatic resource monitoring in the Upper Mississippi River Basin. INHS Reports. Number 371:8-9.

III. Popular Articles

Greg G. Sass and Michael A. McClelland. 2009. "Monitoring the Illinois River Fisheries – Since 1957, Illinois Natural History Survey Biologists Have Been Building a World-Renowned Fisheries Monitoring Program." Illinois Outdoors Magazine article in progress.

IV. Technical Papers (presenters in bold)

Michael A. McClelland, Greg G. Sass, Thad R. Cook, Kevin S. Irons, T. Matt O'Hara, Camilla S. Smith, Nerissa N. Michaels, and Mathew R. Stroub. Fifty Years of the Long-Term Illinois River Fish Population Monitoring Program, 1957-2007. Presented at the 40th Annual Meeting of the Mississippi River Research Consortium, Dubuque, IA, 24-25 April, 2008.

G.G. Sass, T.R. Cook, K.S. Irons, M.A. McClelland, N.N. Michaels, T.M. O'Hara, and M.R. Stroub. Environmental and Economic Impacts of Asian Carps in the Illinois River. Presented at the 40th Annual Meeting of the Mississippi River Research Consortium, Dubuque, IA, 24-25 April, 2008.

Thad R. Cook, Kevin S. Irons, Michael A. McClelland, Greg G. Sass, T. Mathew O'Hara, Nerissa N. Michaels, and Matt R. Stroub. Long-Term Trends in Illinois River Water Quality: Reflective of Global Changes? Poster presented at the 40th Annual Meeting of the Mississippi River Research Consortium, Dubuque, IA, 24-25 April, 2008.

Kevin S. Irons, Greg G. Sass, Thad R. Cook, T. Matt O'Hara, Michael A. McClelland, Nerissa N. Michaels, and Mathew R. Stroub. An Overview of the Illinois River Biological Station's Asian Carps Research. The 64th Annual Meeting of the UMRCC & 15th Annual Meeting of the LMRCC, Collinsville, IL, 18-20 March 2008.

Kevin S. Irons, Greg G. Sass, Thad R. Cook, T. Mathew O'Hara, Michael A. McClelland, Nerissa N. Michaels, and Mathew R. Stroub. An Overview of the Illinois River Biological Station's Asian Carp's Research. Presented at the 46th Annual Meeting of the Illinois Chapter of the American Fisheries Society, Rockford, IL, February 26-28, 2008.

Michael A. McClelland, Greg G. Sass, Thad R. Cook, Kevin S. Irons, T. Matt O'Hara, Camilla S. Smith, Nerissa N. Michaels, and Mathew R. Stroub. Fifty Years of the Long-Term Illinois River Fish Population Monitoring Program, 1957-2007. Presented at the 46th Annual Meeting of the Illinois Chapter of the American Fisheries Society, Rockford, IL, February 26-28, 2008.

Kevin S. Irons, Greg G. Sass, Michael A. McClelland, and Joshua D. Stafford. Reduced Condition Factor of Two Native Fish Species Coincident with Invasion of Non-native Asian Carps in the Illinois River, USA: Evidence for Competition and Reduced Fitness? Fisheries Society of the British Isles International Symposium: Non-native Fishes: Integrated Biology of Establishment Success and Dispersal. University of Exeter, Exeter, U.K., July 23-27.

Kevin S. Irons, Greg G. Sass, Michael A. McClelland, and Joshua D. Stafford. Reduced Condition Factor of Two Native Fish Species Coincident with Invasion of Non-native Asian Carp in the Illinois River: Evidence for Competition and Reduced Fitness? Presented at the 39th Annual Meeting of the Mississippi River Research Consortium, La Crosse, WI, April 12-13, 2007.

Michael A. McClelland and Greg G. Sass. Trends in Largemouth Bass and Bluegill Populations Among the Upper and Lower Illinois River, 1957-2006. Presented at the 39th Annual Meeting of the Mississippi River Research Consortium, La Crosse, WI, April 12-13, 2007.

Kevin S. Irons, Greg G. Sass, Michael A. McClelland, and Joshua D. Stafford. Reduced Condition Factor of Two Native Fish Species Coincident with Invasion of Non-native Asian Carp in the Illinois River: Evidence for Competition and Reduced Fitness? Presented at the 45th Annual Meeting of the Illinois Chapter of the American Fisheries Society, Lake Shelbyville, IL, February 27-March 1, 2007.

Michael A. McClelland and Greg G. Sass. Trends in largemouth bass and bluegill populations among the upper and lower Illinois River, 1957-2006. Presented at the 45th Annual Meeting of the Illinois Chapter of the American Fisheries Society, Lake Shelbyville, IL, February 27-Mar 1, 2007.

Michael A. McClelland, Mark A. Pegg, Kevin S. Irons, and T. Matt O'Hara. Fish Abundances of Backwater Lakes with Connectivity Gradients in the La Grange Reach, Illinois River. Presented at the 37th Annual Meeting of the Mississippi River Research Consortium, La Crosse, WI, April 28-29, 2005.

McClelland, **Michael A.**, Kevin S. Irons, T. Matt O'Hara, Mark A. Pegg, and Thad R. Cook. A Comparison of Two Electrofishing Gears Used for Fish Monitoring on the Illinois River. Presented at the 36th Annual Meeting of the Mississippi River Research Consortium, LaCrosse, WI, April 1-2, 2004.

McClelland, Michael A. and Mark A. Pegg. Longitudinal Patterns of the Illinois Waterway Fish Community. Presented at the 64th Annual Midwest Fish and Wildlife Conference, Kansas City, MO, December 7-10, 2003.

Pegg, M.A. and M.A. McClelland. Assessment of spatial and temporal fish community patterns in the Illinois River. Presented at the American Fisheries Society meeting, Quebec City, Quebec Canada, August, 2003.

O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg. Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. 41st Annual Meeting of the Illinois Chapter of the American Fisheries Society, Mt. Vernon, Illinois, 4-6 March, 2003.

Irons, K.S., T.M. O'Hara, M.A. McClelland, and M.A. Pegg. Status of non-native fish species in the Illinois River. 41st Annual Meeting of the Illinois Chapter of the American Fisheries Society, Mt. Vernon, Illinois, 4-6 March, 2003.

O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg. Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. Presented at the 34th Annual Meeting of the Mississippi River Research Consortium, LaCrosse, Wisconsin, April, 2002.

Irons, K.S., T.M. O'Hara, M.A. McClelland, and M.A. Pegg. White perch distributions in the Illinois River: detecting an invasive species with the Long Term Resource Monitoring Program. Presented at the 34th Annual Meeting of the Mississippi River Research Consortium, LaCrosse, Wisconsin, April, 2002.

O'Hara, T.M., K.S. Irons, M.A. McClelland, and M.A. Pegg. Status of bighead carp and silver carp in the La Grange Reach, Illinois River and possible impacts to the commercial fishery. Presented at the 2002 North Central Division American Fisheries Society River and Streams Technical Committee Meeting, Moline, Illinois, March 2002.

McClelland, M.A., Irons, K.S., and T.M. O'Hara, and M.A. Pegg. White perch (morone americana) occurrence in the Illinois River, Upper Mississippi River System. Presentation at the Illinois-Iowa American Fisheries Society Annual Meeting, Moline, Illinois, February , 2002.

Pegg, M.A. Invasion and transport of non-native aquatic species in the Illinois River. 2001 Governor's conference on the management of the Illinois River System, Peoria, Illinois, October, 2001.

Koel, T.M. and Richard E. Sparks. Ecohydrology of the Illinois River: development of criteria for operation of the La Grange and Peoria locks and dams. 32nd Annual Meeting of the Mississippi River Research Consortium, La Crosse, Wisconsin, April 13-14, 2000.

Koel, T.M., T.R. Cook, and K.S. Irons. Criteria for biota-friendly operations of the Peoria and La Grange locks and dams, Illinois River Waterway. 61st Midwest Fish and Wildlife Conference, Chicago, Illinois December 5-8, 1999.

Koel, T.M. and R.E. Sparks. Interannual variation in catches of young-of-year fish correlated with hydrology of the Upper Mississippi River System. 47th Annual Meeting of the North American Benthological Society, Duluth, Minnesota, May 23-24, 1999.

Koel, T.M. Changes in fish community structure: effects of hydrological variability in the Upper Mississippi River System. Presented to the Illinois Natural History Survey, Center for Aquatic Ecology, Havana Field Station Director Search Committee and Senior Staff, March 24, 1999.

Koel, T.M. Spatial and temporal variability of channel catfish populations in the Upper Mississippi River System. Illinois Department of Natural Resources LTRMP field station biannual retreat, Dickson Mounds, Illinois, December 15, 1998.

Koel, T.M. Long Term Resource Monitoring Program Showcase: analysis of catfish catch. Environmental Management Program Coordinating Committee, Fall Quarterly Meeting, Rock Island, Illinois, November 19-20, 1998.

Koel, T.M. and K.D. Blodgett. Fish-environment associations: effects of inter-annual hydrological variability on fish populations of the Illinois River waterway, 1957-1997. Upper Mississippi River Conservation Committee, Fish Technical Section Annual Fall Meeting, Dubuque, Iowa, September 15-17, 1998.

Koel, T.M., K.S. Irons, T.M. O'Hara, K.D. Blodgett, and R.E. Sparks. Changes in fish community structure: effects of hydrological variability in the Upper Mississippi River System. 128th Annual Meeting of the American Fisheries Society, Hartford, Connecticut, August 23-27, 1998.

Koel, T.M., T.M. Mihuc, R.E. Sparks, and K.D. Blodgett. Upper Mississippi River System status and trends report. Fish species-environment relationships: LTRMP data analysis and preliminary results. 54th Annual Meeting of the Upper Mississippi River Conservation Committee, Moline, Illinois, 17-19 March 1998.

Blodgett, K.D. and T.M. Mihuc. Decision support using Long Term Resource Monitoring Program component data and supplementary data on the Illinois River. 54th Annual Meeting of the Upper Mississippi River Conservation Committee, Moline, Illinois, 17-19 March 1998.

Koel, T.M. and T.M. Mihuc. Fish abundance in the La Grange Reach of the Illinois River correlated with environmental factors: problems of cross-component analysis. Presented at the Long Term Resource Monitoring Program Annual Winter Meeting, Davenport, Iowa, and 13 January 1998.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Some upstream-to-downstream differences in Illinois River fish communities. Contributed paper presented at the Illinois State Academy of Science Annual Meeting, Galesburg, Illinois, 7 October 1994.

Sparks, R.E. Large river-floodplain ecosystems of the Midwest: status, trends, and management needs. Presented at the U.S. Environmental Protection Agency's "Ecological Seminar Series" held in Chicago, Illinois, 14 March.

IV. Poster Presentations (presenter in bold)

Koel, T.M. and R.E. Sparks. The Long-term Illinois River Fish Population Monitoring Program. National Meeting of the Ecological Society of America, Spokane, Washington, August 10-14, 1998.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1994) in fish populations of the Illinois River. Poster presented at the 56th Midwest Fish and Wildlife Conference, Indianapolis, Indiana, 4-7 December 1994.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1994) in fish populations of the Illinois River. Poster presented at the Illinois State Academy of Science Annual Meeting, Charleston, Illinois, 6 October 1995.

Lerczak, T.V., R.E. Sparks, and K.D. Blodgett. Long-term trends (1959-1994) in fish populations of the Illinois River with emphasis on upstream-to-downstream differences. Poster presented at the annual meeting of the Mississippi River Research Consortium, La Crosse, Wisconsin, 26-28 April 1995.

Michael A. McClelland, Greg G. Sass, Thad R. Cook, Kevin S. Irons, T. Matt O'Hara, Camilla S. Smith, Nerissa N. Michaels, and Mathew R. Stroub. Fifty Years of the Long-Term Illinois River Fish Population Monitoring Program, 1957-2007. Presented at the 46th Annual Meeting of the Illinois Chapter of the American Fisheries Society, Rockford, IL, February 26-28, 2008.

Pegg, M.A. and M.A. McClelland. Long-term fish population trends along the Illinois River. Poster presented at the 63rd Midwest Fish and Wildlife Conference, Des Moines, Iowa, December, 2001.

Pegg, M.A. and M.A. McClelland. Long-term fish population trends along the Illinois River. Poster presented at the 131st Annual Meeting of the American Fisheries Society, Phoenix, Arizona, August, 2001.

V. Popular Presentations

Lerczak, T.V. Wintering bald eagles along the Illinois River and factors affecting their environment. Invited presentation to the Peoria Audubon Society, Peoria, Illinois, 8 March 1995.

Lerczak, T.V. Seminar on Illinois River environmental issues. Conducted for Biology 140 (Human Ecology) at Spoon River College, 27 June 1994.

Lerczak, T.V. A photo trip up the Illinois River. After dinner talk presented to Havana Rotary Club, Havana, Illinois, 17 April 1995.

Blodgett, K.D. Ecosystem management for the Illinois River: can biological integrity be restored? Invited lecture for Earth Day celebration at Spoon River College, Canton, Illinois, 19 April 1995.

McClelland, M.A. The Long Term Illinois River Fish Population Monitoring Program. After dinner talk presented to Central Christian Men's 10th Annual Fish Fry, August 2003.

VI. Data Requests

1. Sam Cull, City of Peru, Electrical Department, Peru, Illinois
2. Stanley and Associates, Muscatine, Iowa
3. U.S. Army Corps of Engineers, Rock Island, Illinois
4. Shelly Miller, Aquatic Ecologist, The Nature Conservancy, Peoria, Illinois
5. K. Douglas Blodgett, Project Manager, The Nature Conservancy, Havana, Illinois
6. Kevin Irons, Fishery Biologist, LTRMP, Havana, Illinois
7. Matt O'Hara, Fishery Biologist, LTRMP, Havana, Illinois
8. Scott Langloss, Writer for Adventure Sports Outdoors
9. Richard Sparks, Director of Research National Great Rivers Research & Education Center
10. Jim Mick, Illinois Department of Natural Resources
11. James B. McLaren, ASA Analysis & Communication, Inc.
12. Ximing Cai, University of Illinois
13. Rob Maher, Illinois Department of Natural Resources
14. Karen Haggerty, U.S. Army Corps of Engineers
15. Mike Kacinski, EA Engineering
16. Sam McCord, EA Engineering
17. Kelly Baerwaldt, U.S. Army Corps of Engineers
18. Dave Thomas, Former Chief of Illinois Natural History Survey